MANCHESTER CLIMATE CHANGE FRAMEWORK (2020-25) 2022 UPDATE

1. INTRODUCTION

Manchester's Climate Change Framework 2020-25 (the Framework)

The aim of the Framework[1] is that:

Manchester will play its full part in limiting the impacts of climate change and create a healthy, green, socially just city where everyone can thrive

Its vision is for:

A green city with walkable neighbourhoods, clean air, good jobs in successful businesses, warm homes and affordable energy, safe cycling routes and a public transport system that works for everyone.

The Framework used a science-based targets approach to set a zero carbon date of 2038 and a carbon budget for direct emissions of 15m tCO2 for the period 2018-2100 for the city.

The Framework set four headline objectives:

- **Staying within our carbon budgets** – whilst this primarily relates to our direct emissions, it also recognises the need to tackle our indirect emissions (from the things we consume, and which generate greenhouse gases through their production, transportation and disposal) and aviation emissions.
- **Climate adaptation and resilience** – adapting the city's buildings, infrastructure and natural environment to the changing climate and increasing the climate resilience of our residents and organisations.
- **Health and wellbeing** – improving the health and wellbeing of everyone in Manchester through actions that also contribute to our objectives for CO2 reduction and climate adaptation.
- **Inclusive, zero carbon and climate resilient economy** – ensuring we have an economy where everyone can play an active role in decarbonising and adapting the city to the changing climate.

It also identified six priority areas for action:

- Buildings (existing and new)
- Renewable energy
- Transport and flying
- Food
- The things we buy and throw away
- Green infrastructure and nature-based solutions

Manchester Climate Change Partnership (MCCP) was established in 2018 and brings together organisations from across the city's public, private, community, faith, health, culture, and academic sectors that share the common goal of helping Manchester to limit its greenhouse gas emissions and build resilience to a changing climate.

[1] Manchester Climate Change Framework 2020-25 | Manchester Climate Change

Its aim is to work with the Manchester Climate Change Agency (MCCA), Manchester communities and other relevant partners to ensure the city develops and successfully implements a climate change strategy aligned with the latest science and built on the views of city stakeholders.

Its objectives are to work with MCCA and other partners to: ensure the city maintains climate targets aligned to the Paris Agreement; has a robust strategy and implementation plan to the meet those targets; champions the delivery of effective climate action across sectors; engages and influences stakeholders and communities to act; provides evidence based reporting on the city's progress towards its climate targets and objectives; and helps to establish Manchester as a world class city for action on climate change.

In line with these objectives, Manchester's Climate Change Framework (and this 2022 Update) comes from Manchester's Climate Change Partnership, as produced by Manchester Climate Change Agency, and provides an independent, expert strategy, targets and plan for the city to play its full part in tackling the climate crisis in a just and equitable way.

Purpose of the 2022 Update

The 2022 Update to the Framework is not making any changes to the zero carbon date of 2038, nor to the carbon budget or its associated headline objectives or priority areas.

The purpose of the Update is to provide more granularity to the targets, and more specificity to the actions we need to take, in order that we may more successfully deliver on our ambition to become a thriving, zero carbon city.

Manchester is not currently on track to stay within its carbon budget. We have not been reducing our direct emissions by 13% per annum, and so urgent action must be taken.

The first milestone within the city's carbon budget is to achieve a 50% reduction in our direct emissions by 2025. Our current trajectory means we are at risk of missing this target.

A core intention of this Update, therefore, is to set out the **scale of action needed, at granular level, to reduce our direct emissions by 50%** to give us the best chance of staying within our overall carbon budget.

As such, the direct emissions from our buildings and ground transport, supported by an increase in renewable energy, are a major focus of the new granular targets in this Update. The evidence base for these new granular targets was provided by the SCATTER[2] model developed by Anthesis. An overview of this tool, including notes on assumptions made within the modelling data will be included as an appendix to the final publication of the Update.

Alongside these targets, the Update presents **detailed, specific recommended actions**, co-created with a wide range of stakeholders (more information in section 9), that focus on where there is agency to act, that is, where there is direct control to deliver, affect or influence the required level of emissions reductions.

Four categories have been identified for the recommended actions:

- **To be delivered locally / direct control lies in Manchester**
- **To work at city-region level / with Greater Manchester partners on**
- **To advocate for national government to do**
- **To do differently / opportunities to innovate**

[2] SCATTER: Emissions Reporting Tool for Local Authorities - Anthesis Group

The Update also shows the impact that our performance to date is having, and could have, on our overall carbon budget. It sets out a series of scenarios for the city – **different pathways of emissions reductions** – to show what needs to be done to get back on track by 2025, to stay within our carbon budget by 2038, and if we continue to decarbonise at the average rate we were achieving before the pandemic.

Finally, this Update also to provides **details of new research and initiatives** that have been delivered in support of the Framework since it was published relating to the objectives for Adaption and Resilience, Health and Wellbeing, and Inclusive Economy. This is in line with commitments made in the Framework itself and with the objectives of the MCCP - to ensure the city has a robust strategy, targets, and plan, aligned to the latest science, policy and technology development, to enable to play its full part in tackling the climate crisis.

Key messages

Urgent action is needed to **reduce direct emissions** from our buildings and ground transport, and to increase renewable energy generation, if Manchester is to stay within its carbon budget.

Decisive action is needed to assess the city's vulnerability to climate change and to ensure we are adapting our infrastructure, buildings, economy, and residents to **be resilient to a changing climate**.

Everyone has a role to play – individuals, organisations, local and national government – and there is a great deal we have the power to achieve locally, if we **work collaboratively**.

The cost of transitioning to zero carbon cannot be borne solely by the public purse, so we need to find innovative ways to **unlock private finance investment**.

Moving to a low carbon and climate resilient city brings opportunities to **deliver wider strategic ambitions**, including improving people's health, reducing fuel and food poverty, creating new jobs and economic growth, and delivering a greener city for everyone.

Purpose of this report

This report contains detailed updates against the following headings that will form the main part of the 2022 Update to Manchester's Climate Change Framework (2020-25).

The information is being provided to a wide range of stakeholders **for review and comment** in July, before the final 2022 Update is published in September.

1. Introduction and overview
2. Staying within our carbon budget
    a. Buildings
    b. Renewable energy
    c. Transport
    d. Aviation
    e. Indirect emissions
3. Adaptation and resilience
4. Health and wellbeing
5. Inclusive, zero carbon and climate resilient economy
6. Ensuring a just transition
7. Financing the transition
8. Engagement with stakeholders

Additional sections, for example a Foreword from MCCP and a range of appendices, will be included in the final publication; all graphs and charts will also be labelled at this time.

Next steps

Feedback on this report will be captured throughout July and the final version of the 2022 Update will be approved by MCCP and published in September.

MCCP will then work with MCCA and relevant partners to champion and instigate actions set out in the Update.

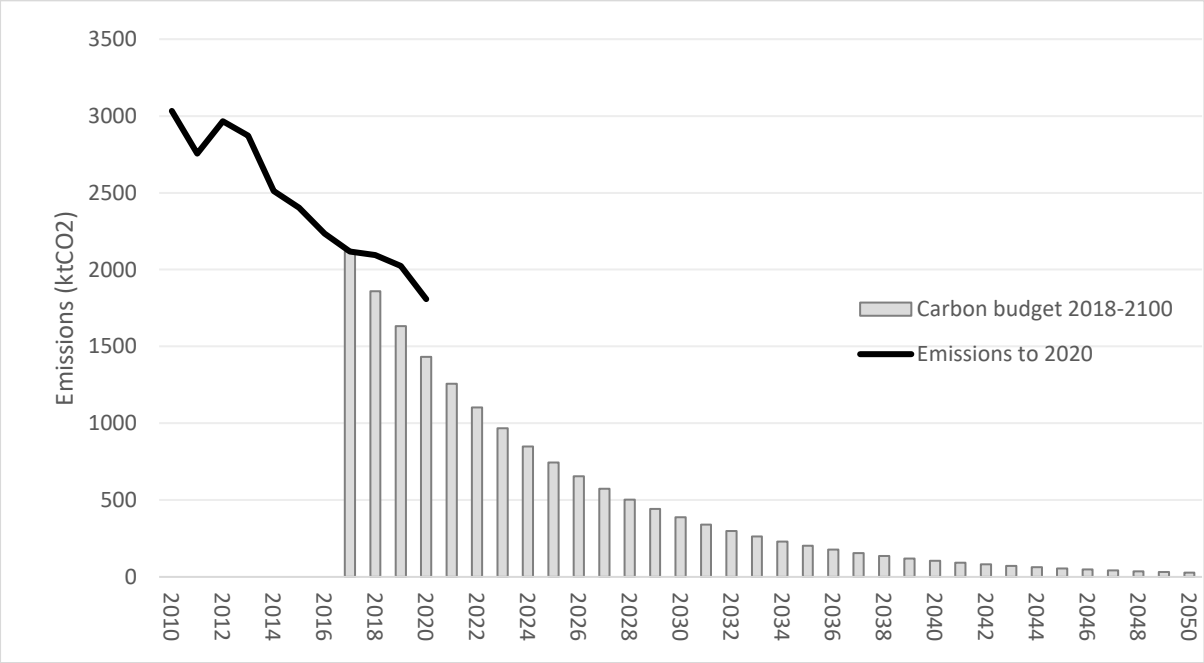
MCCP will also work with MCCA to identify methods and resources by which the more granular targets and recommended actions can be tracked and reported to the city, enabling a more detailed picture of progress to be presented. This will build on the existing Climate Change Annual Reports[3] produced for the city that focus primarily on the overall CO2 emissions data generated by the UK government on an annual basis (with 2 year lag).

2. STAYING WITHIN OUR CARBON BUDGETS

Manchester's Climate Change Framework (2020-2025) sets a science-based target for the city to reach net zero by 2038 and a carbon budget for direct emissions of 15m tCO2 for the period 2018-2100. **The first milestone in the Framework is for the city to reduce its direct emissions by 50%** by 2025.

Direct emissions are sometimes described as territorial emissions and include emissions from our buildings and from ground transport inside the city.

Graph XX shows Manchester's carbon budget (vertical bars) and our actual emissions to 2020 (descending line). The gap between the line and the bars means we are not on track to stay within our carbon budget, as reported in the city's Climate Change Annual reports.



[3] How are we doing? | Manchester Climate Change

Scenarios for staying within our carbon budget

Graph XX sets out two scenarios for the city to remain within its carbon budget to illustrate the challenge we face, and the urgency and scale of action needed.

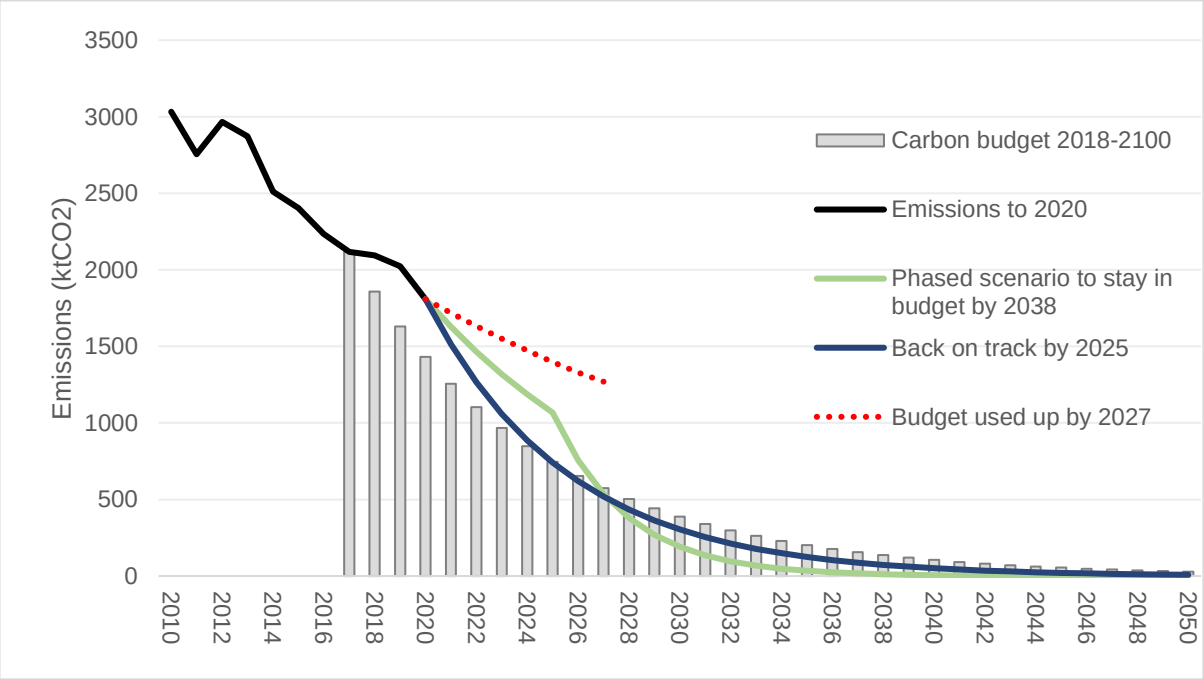
The **blue line** gets the city back on track by 2025.

It requires immediate, large-scale action and investment to deliver a 16% reduction in direct emissions per annum (pa) every year until 2038. This is a higher annual reduction than originally proposed (13%) and much higher than the average achieved pre-pandemic (just under 5% pa).

The **green line** ensures the city stays within its carbon budget to 2038 via a phased approach to emissions reductions.

The first phase to 2025 requires a 10% pa reduction in direct emissions, just below the levels achieved during lockdowns in 2020. This provides time for the city to develop the projects, financial investment and delivery systems needed in phase two. Phase two requires a much steeper reduction in direct emissions of 29% pa, every year to 2038.

The **red dotted line** shows we will use up our carbon budget by 2027 if we continue to reduce our direct emissions at just above the average rate the city was achieving pre pandemic (5% pa).



Scale of action required to reduce direct emissions by 50%

The following sections of this 2022 Update identify the **scale of action** needed to achieve a 50% reduction in our direct emissions, as defined by the SCATTER model.

They identify granular targets for new and existing buildings, ground transport[4], and renewable energy generation.

[4] Ground transport includes cars, vans, motorbikes, trams, and trains

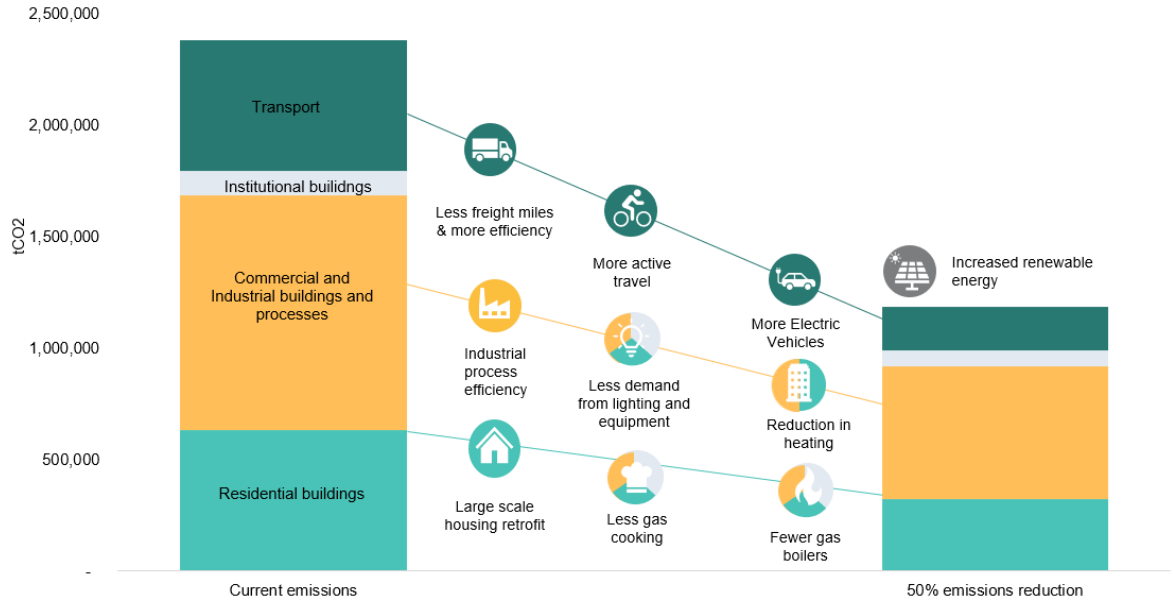
Graph XX summarises this visually.

The left hand column shows our current direct emissions and how they are split between ground transport and buildings.

Buildings are disaggregated into institutional[5], commercial and industrial[6], and domestic buildings.

The right hand column shows how each of these categories needs to shrink so that collectively the city's direct emissions reduce by 50%.

The 'zip wires' between the two columns highlight the key actions needed to achieve the required reduction in direct emissions.



In each of the following sections, the granular targets are accompanied by:

- Carbon savings - showing how each action contributes to the overall emissions reductions required.
- Indicative costs - including upfront capital investment and operational savings, along with potential funding streams.
- Challenges of implementation - based on research in the relevant sector and local consultations.
- Co-benefits - highlighting the positive impacts that climate action can deliver in other areas.
- Stakeholders, sectors, and relevant partners - identifying who can support change.
- Recommended actions – specific steps that can be taken locally, at city region level, and nationally to help achieve the targets. These have been developed in collaboration with a range of stakeholders (see section 9).

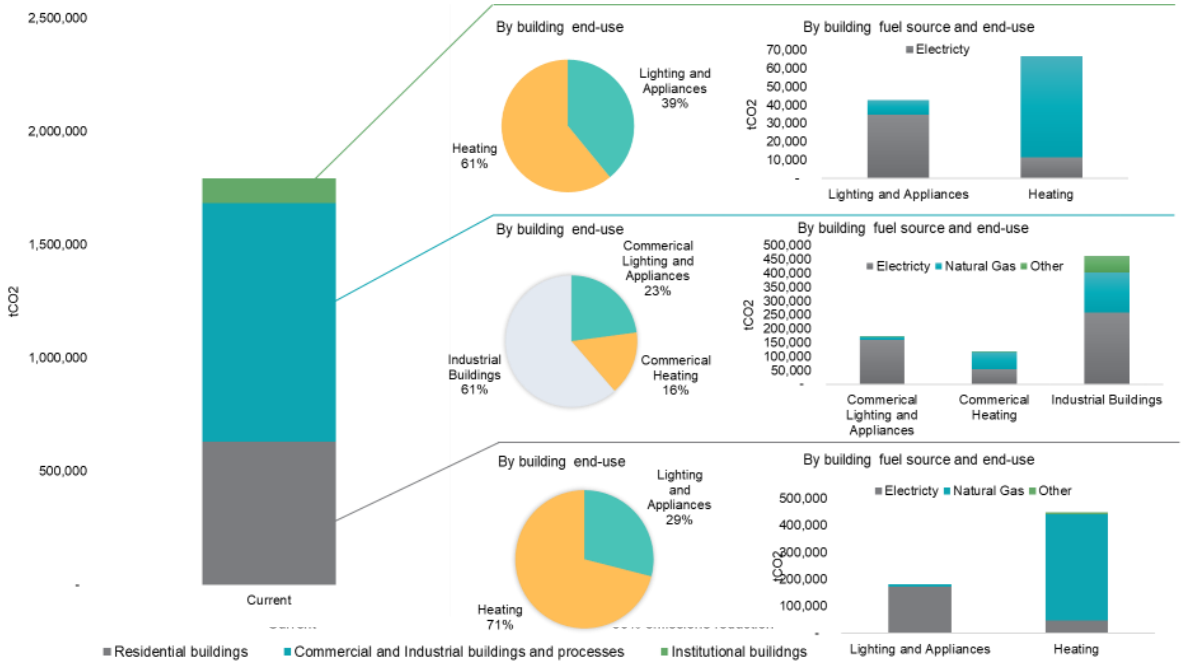
[5] Institutional buildings include schools, hospitals, government offices, street lighting, and other public facilities
[6] Commercial and industrial buildings include direct emissions from industrial processes

2a. Buildings

Current emissions

Modelling shows the built environment is responsible for 64% of Manchester's direct emissions.

Graph XX below shows how the emissions from Manchester's built environment are broken down by building type, end-use in the building, and by the mix of fuel.



Institutional buildings

Institutional buildings are public buildings such as schools, hospitals, government offices, highway street lighting, and other public facilities[7].

- 6% of Manchester's total carbon emissions are from institutional buildings
  - 61% of institutional emissions are from space heating and hot water
  - 89% of heating is powered by gas and 11% by electricity
  - 39% of emissions are from lighting and appliances

Commercial buildings

Commercial premises are buildings that serve the public including restaurants, offices, hotels, retail stores.

85% of the office stock in Manchester is at risk of not meeting the Government's target for all non-domestic properties to have an EPC B rating by 2030[8].

- 21% of Manchester's total carbon emissions are from commercial buildings
  - 48% of commercial emissions are from space heating and hot water
  - 67% of heating powered by gas and 32% by electricity
  - 52% of emissions are from lighting and appliances

[7] Institutional buildings refers to emissions from energy used in public buildings such as schools, hospitals, government offices, highway street lighting, and other public facilities.
[8] Sustainability and Value in Regions JLL

Industrial buildings

Industrial buildings include all types of manufacturing, processing and logistics operations and the data used here covers both the buildings and the operations contained within.

- 31% of Manchester's total carbon emissions are from industrial buildings
  - 61% of industrial emissions are associated with the buildings
    - 41% powered by gas, 42% electric and 17% petroleum products
  - 39% of industrial emissions come from industrial processes
    - 79% of that is from general manufacturing operations
  - 34% of emissions from industrial are fugitive emissions

Domestic buildings

Manchester has 228,786 domestic properties, housing 586,100 residents[9]. The mix of buildings is 39% flats, 34% terraced houses, 24% semi-detached, and 3% other.

- 22% of Manchester's total carbon emissions are from domestic buildings
  - 71% of domestic carbon emissions are from space heating and hot water
  - 92% of domestic heating is powered by gas, 6% electricity and the remaining by other sources (coal and petroleum)
  - 39% of domestic carbon emissions are from electric lighting and appliances

60% of homes in Manchester were built before 1965, 23% were built before 1919[10]. The UK Green Building Council (UKGBC) say 80% homes we will occupy in 2050 are already built[11].

The ownership of Manchester homes can be split into three categories: 33% owned by their occupants, 39% privately rented and 28% socially rented (7% above national average).

Over half (58%) of the 238,000 homes are energy inefficient with Energy Performance Rating (EPC) D – G[12] failing to deliver health and comfort to inhabitants[13] and costly to heat.

In 2019, 20% of Manchester's households were fuel poor, more than the English average[14]. Each year, these residents would have to spend £223 more on their energy to keep warm than a household that is not in fuel poverty[15]

In order to reach zero carbon

- We need to **retrofit existing building stock at scale** – Our homes, institutions and commercial premises need to be better insulated, switch off gas for heating and use more efficient appliances; this will reduce emissions and bring co-benefits such as helping to create warm dry homes that address fuel poverty and health inequality.
- We need to ensure **new buildings** are constructed to extremely high standards of energy efficiency performance and do not add to our emissions or the future cost of decarbonization. Manchester is set to build over 56,000 new homes between 2021-2037[16].

[9] https://www.manchester.gov.uk/info/200088/statistics_and_intelligence/7611/intelligence_hub and https://www.manchester.gov.uk/info/200088/statistics_and_intelligence/438/population
[10] Council Tax: stock of properties Statistical Summary - GOV.UK (www.gov.uk)
[11] Climate change - UKGBC - UK Green Building Council
[12] Energy Performance of Buildings Certificates (EPC) in England and Wales 2008 to March 2022
[13] https://www.theade.co.uk/assets/docs/resources/Energising_Greater_Manchester_050718v2.pdf
[14] https://www.gov.uk/government/statistics/sub-regional-fuel-poverty-2021
[15] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1056777/annual-fuel-poverty-statistics-lilee-report-2022-2020-data.pdf
[16] https://www.greatermanchester-ca.gov.uk/what-we-do/planning-and-housing/places-for-everyone/

Scale of action needed to reduce emissions by 50%:

Modelling by SCATTER indicates the following scale of action is needed.

Domestic buildings

- Over 84,000 homes to be retrofitted[17]
- 21% reduction in energy demand from domestic heating and hot water
- 31% reduction in energy demand from domestic appliances and lighting
- 39% of homes to switch off gas heating and install electric heat pumps

Commercial buildings

- 61% reduction in overall energy demand from commercial premises, including
    - 17% reduction for heating, cooling and hot water
    - 33% reduction in gas use for space heating, cooling, and hot water
    - 74% reduction for lighting, appliances, equipment and catering

Institutional buildings

- 45% reduction in overall energy demand from institutional buildings
    - 37% reduction for heating, cooling and hot water
    - 63% reduction for lighting, appliances, equipment and catering

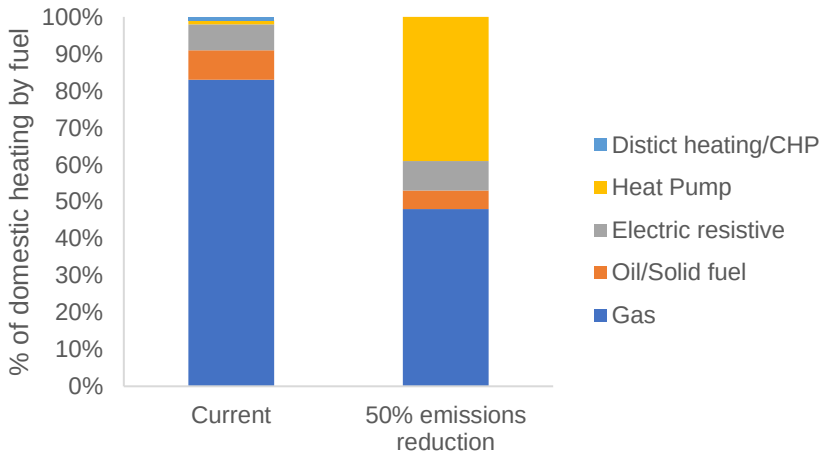
Industrial buildings

- 58% reduction in overall energy demand from industrial buildings and processes
    - 55% reduction for buildings and facilities including heating, cooling, hot water, lighting, and appliances
    - 63% reduction from industrial processes[18]

New buildings

- 100% of new homes must meet Passivhaus standard at minimum

Graph XX shows how the heating of our homes needs to change to deliver a 50% reduction in emissions; the key message being we need to shift off gas to electrified heating, primarily via adoptions of air source or ground source heat pumps.



[17] https://scattercities.com/pages/pathways-methodology/ and Appendix XX
https://www.energyrating.org.uk/energy_performance_certificate1.html
18 Fugitive emissions are excluded from this data

CO2 savings

The expected CO2 savings from delivering all the above actions is **3,402k tCO2e**

- 1,375k tCO2e – Domestic heating and hot water
- 379k tCO2e – Non-domestic heating and hot water
- 245k tCO2e – Domestic lighting, appliances, and cooking
- 322k tCO2e – Non-domestic lighting, appliances, equipment and catering
- 828k tCO2e – Industrial buildings and facilities
- 253k tCO_2e – Industrial process efficiency

Costs and savings

The estimated capital cost of delivering the above actions is **£1.2bn.**

The cumulative operational cost savings are estimated to be **£31m.**

It should be noted that the upfront cost of retrofitting buildings and the savings accrued from increased energy efficiency are often incurred by different parties.

Potential Funding sources:

There are a range of funding sources that can support building decarbonisation:

- Public Sector Decarbonisation Scheme
- Green Homes Grant Local Authority Delivery Scheme
- Affordable Warmth Scheme (winter payments scheme)
- Home upgrade / boiler upgrade grants
- The Energy Company Obligation (ECO) scheme
- Domestic & Non-Domestic Renewable Heat Incentives
- BEIS Heat Networks Investment Programme
- Green Heat Network Fund (GHNF) Transition Scheme
- Social Housing Decarbonisation Fund
- Public Works Loan Board

More work is needed to develop new and innovative business models that can unlock private finance at scale (see section 7).

Other policy drivers and enablers

- Manchester's Local Area Energy Plan echoes the need for building retrofit at scale, targeting 100,000 homes to be retrofit and 180,000 heat pumps to be deployed by 2038[19]
- Manchester's Strategic Housing Plan commits that 50% of homes built by 2025 will be low or zero carbon, at least a third of the city's 70,000 social homes will be retrofitted to low carbon standards by 2032, and a retrofit programme will be developed for all the houses in the city[20]
- By 2030, Greater Manchester Combined Authority's (GMCA) 'retrofitGM'[21] headline objective is to have reached an average of 61,000 domestic retrofits a year, and all

[19] The Manchester LAEP is being published on the Green City Region website in July 2022
[20] New Housing Strategy looks to deliver 10,000 new affordable homes in the next 10 years | Manchester City Council
[21] https://www.greatermanchester-ca.gov.uk/media/6018/retrofitgm.pdf

non-domestic buildings reaching an average of Energy Performance Certificate rating C or Display Energy Certificate B.

- All Greater Manchester Local Authorities to obtain an average DEC rating of D or better by 2024, and C or better by 2030, for their buildings where economically viable[22]
- Manchester's Climate Change Partnership developed a Zero Carbon New Build Roadmap[23], led by the development community, setting targets for operational and embodied carbon emissions, in line with the objective to shift all new builds to zero carbon from 2023 articulated in the city's Climate Change Framework 2020-25
- GMCA have a goal for all new developments to be net zero carbon by 2028[24]
- UKGBC[25] have set out detailed standards for operational and embodied carbon limits, including pathways to reduce this over time, to transition the construction sector to zero carbon
- From April 2018, homes that are privately rented are subject to minimum energy efficiency standards and those with F and G ratings will have to improve[2627].
- The Committee on Climate Change (CCC), say that 19 million heat pumps need to be installed by 2050[28] Heat pumps are a well-established technology that have already seen widespread deployment across much of Europe[29]
- The cost of retrofitting a new build is 3-5 times higher[30] than ensuring it meets stretching zero carbon standards at the point of design and construction
- The cost uplift of building to zero carbon standards are calculated as 6.2% for office and 3.5% for residential compared to the baseline scenarios[31]. This cost uplift can be considered feasible today given these costs will likely be offset by the value benefits, including increased rental premiums, lower tenancy void periods, lower offsetting costs, and lower operating/ lifecycle costs[32].
- Results from UKGBC report[33] demonstrate the importance of including offset payments within the capital cost appraisal for new buildings. Carbon prices will only increase over the next decade, and this will impact the absolute values of buildings.

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[22] https://www.skillsforgrowthsme.co.uk/news/posts/2021/september/retrofit-powering-the-future-of-greater-manchester-sustainability-agenda/
[23] https://www.manchesterclimate.com/sites/default/files/Roadmap%20to%20Net%20Zero%20Carbon%20-%20Report.pdf
[24] https://www.greatermanchester-ca.gov.uk/news/greater-manchester-calls-on-government-not-to-cap-climate-ambition-for-new-homes/
[25] https://www.ukgbc.org/wp-content/uploads/2021/11/UKGBC-Whole-Life-Carbon-Roadmap-A-Pathway-to-Net-Zero.pdf
[26] https://scattercities.com/pages/pathways-methodology/
[27] https://www.gov.uk/guidance/domestic-private-rented-property-minimum-energy-efficiency-standard-landlord-guidance
[28] https://www.theccc.org.uk/wp-content/uploads/2019/05/Net-Zero-Technical-report-CCC.pdf
[29] https://www.ehpa.org/fileadmin/red/09._Events/2019_Events/Market_and_Statistic_Webinar_2019/20190624_-_EHPA_Webinar_outlook_2019_-_Thomas_Nowak.pdf
[30] https://www.theccc.org.uk/wp-content/uploads/2019/07/The-costs-and-benefits-of-tighter-standards-for-new-buildings-Currie-Brown-and-AECOM.pdf
[31] https://ukgbc.s3.eu-west-2.amazonaws.com/wp-content/uploads/2020/09/05144623/Executive-Summary_-Building-the-Case-for-Net-Zero.pdf
[32] https://www.jll.co.uk/content/dam/jll-com/documents/pdf/research/Sustainability%20and%20Value%20in%20the%20Regions%20-%20Final%20Report.pdf
[33] https://ukgbc.s3.eu-west-2.amazonaws.com/wp-content/uploads/2020/09/05144621/Building-the-Case-for-Net-Zero_UKGBC.pdf

- Evidence demonstrates that there is significant energy efficiency potential within non-domestic buildings. Mandatory energy disclosure as part of performance-based rating systems across multiple sectors is needed to stimulate markets to realise this potential[34].

Challenges

- National and local policy is not currently driving change at the pace and scale required, either in retrofit or new build standards.
- There are competing priorities for policy makers, for example balancing the demand for more housing with the need to increase zero carbon standards in new builds.
- The capital cost of retrofit, lack of grant funding and an under-developed supply chain are discouraging property owners to retrofit.
- There are limited market signals to stimulate supply chain growth and the provision of skills development, further restricting capacity for action at scale.
- Immature industry standards for new build and retrofit make it difficult to drive consistent uptake of zero carbon measures or reporting.
- Absence of standardised energy efficiency disclosure means progress cannot be tracked at city scale.
- The UK currently has one of the highest ratios of gas to electricity across Europe, sometimes known as a 'spark gap', with the price of electricity being close to four times that of gas per kWh[35]. This is in a large part due to the taxation placed on electricity above that of gas. According to OFGEM, the environmental and social obligation costs represent 20.44% of an electricity bill,[36] whereas for gas the same proportion is 1.6%.[37]

Co-Benefits of action - Links to other headline objectives

Adaptation and resilience

- Retrofitting homes helps to ensure residents are better placed to withstand heat waves or excessively cold spells.
- Energy efficient appliances, including dishwashers and washing machines, can also minimise water use therefore help mitigate against water scarcity.
- Increasing the energy efficiency of housing stock can reduce overall energy security concerns and help build local energy resilience.
- Zero carbon new builds often incorporate nature-based solutions to climate adaptation in their surrounding areas and so build resilience to a changing climate.

Health and wellbeing

- Fuel poverty can be addressed by increasing the energy efficiency of a dwelling to EPC C which would save an average of £223 per year on fuel costs[38].

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[34] https://www.ukgbc.org/wp-content/uploads/2021/11/UKGBC-Whole-Life-Carbon-Roadmap-A-Pathway-to-Net-Zero.pdf
[35] https://www.ehpa.org/fileadmin/red/09._Events/2019_Events/Market_and_Statistic_Webinar_2019/20190624_-_EHPA_Webinar_outlook_2019_-_Thomas_Nowak.pdf
[36] https://www.ofgem.gov.uk/data-portal/breakdown-electricity-bill
[37] https://www.ofgem.gov.uk/data-portal/breakdown-gas-bill
[38] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1056777/annual-fuel-poverty-statistics-lilee-report-2022-2020-data.pdf

- Retrofitting measures create warmer, drier homes and thus impact positively on the health and wellbeing of their residents.
- An improved indoor climate can create health benefits, such as fewer diseases and reduced mortality.
- High energy bills can create financial stress and so reduced energy costs can help the prevention of mental disorders (e.g., anxiety, depression).
- Investing £1 in keeping homes warm is estimated to reduce direct health costs by £0.42[39].

Inclusive, zero carbon and resilient economy

- Upgrading the energy efficiency of Manchester's homes will present a huge opportunity to boost the local economy[40].
- Growing the market for green products and services creates opportunities for local companies and local people to diversify and develop new skills and new businesses.
- 9,800 jobs could be supported in the Northwest[41] by an energy efficiency programme in the UK.
- Ambitious retrofit programmes in the public sector and social housing sector, build demand for skills and supply chain growth by providing a stable pipeline to enable rapid expansion of market delivery capability.

Examples of good practice

- Many institutional buildings, including those of Manchester City Council (MCC), the city's universities and its health sector, have committed to achieve zero carbon by 2038 and have action plans in place[42].
- Over £20m is being deployed by MCC and other public institutions across Manchester to retrofit their built estate (Public Sector Decarbonisation Scheme)[43]
- 'Your Home Better' has been launched in Greater Manchester to support housing retrofit, initially targeting owner occupiers that are able to pay to help create certainty for the retrofit market to grow into.
- Since 2009, the percentage of Manchester's non-domestic buildings with an EPC rating between A-C has increased from 34% to 60%.
- MCCP worked collaboratively across the city to publish a zero carbon roadmap for new buildings[44]
- Manchester has one of the highest proportions of existing BREEAM 'Good to Outstanding' office stock[45], however there are currently very few net-zero offices disclosed in the city that meet the UKGBC standard for net zero[46].

[39] https://www.nea.org.uk/wp-content/uploads/2021/11/0000_NEA_Fuel-Poverty-Report-and-Exec-Summary_v2.pdf
[40] https://www.theade.co.uk/assets/docs/resources/Energising_Greater_Manchester_050718v2.pdf
[41] https://friendsoftheearth.uk/sites/default/files/downloads/making-better-job-it-full-report-75291.pdf
[42] https://www.manchesterclimate.com/sites/default/files/MCCA%20Annual%20Report%202021%20Final.pdf
[43] https://www.manchester.gov.uk/news/article/9001/19m_energy_efficiency_scheme_almost_complete
[44] https://www.manchesterclimate.com/sites/default/files/Roadmap%20to%20Net%20Zero%20Carbon%20-%20Report.pdf
[45] https://www.greenbooklive.com/index.js,p
[46] https://www.ukgbc.org/ukgbc-work/net-zero-carbon-buildings-verification/

Recommended Actions

Action needs to be taken by government at local and national level, by institutions and organisations in the private and voluntary sector, and by residents and communities across the city.

These recommended actions have been co-designed with stakeholders across the city to help enable everyone to play their full part in tackling the climate crisis and meeting the ambitious targets that Manchester has adopted.

To be delivered locally / direct control lies in Manchester:

(New build)

Buildings 1. **Property developers**, and those who commission new buildings in the public and private sector, to apply the highest zero carbon standards to new developments from 2023.

Buildings 2. Manchester Climate Change Partnership (MCCP) to engage the developer community in progressing the sector's understanding of the **financial viability** considerations of stretching whole-life carbon standards.

Buildings 3. Manchester City Council (MCC) to make full use of its existing planning powers, including the Local Plan, to regulate for **whole-life carbon emissions standards** in all new buildings, covering operational and embodied carbon in line with targets set out in Manchester's Zero Carbon New Build Roadmap, the UKGBC whole life carbon roadmap [47], and the emerging Future Buildings Standard, from 2023 (going faster than UK) and increasing over time.

Buildings 4. MCC to require a percentage of energy used on site by new builds to be from **renewable energy** or low carbon sources in the locality.

Buildings 5. MCC to use planning policies to include **carbon offset levies** for developments that do not meet specified zero-carbon requirements.

(Retrofit)

Buildings 6. **Public sector** organisations to have retrofit programmes in place to reduce the operational emissions from their buildings in line with Manchester's carbon budget, and to disclose energy efficiency performance data.

Buildings 7. **Private sector** organisations to retrofit their commercial or industrial premises in line with Manchester's carbon budget, and to disclose energy efficiency performance data.

Buildings 8. MCC to develop a **Housing Retrofit Strategy by 2023** that covers all domestic housing whether owner occupied, private rented or social housing.

Buildings 9. **Social housing providers** to retrofit at least one third of their 70,000 homes by 2032, alongside reducing energy use across their estates so that all homes achieve an EPC rating of B or above.

Buildings 10. **Private rented sector (PRS) landlords** to allocate funds to assess the energy efficiency of their properties and develop an improvement plan to implement MEES regulations across all tenures, ensuring all Manchester's homes meet EPC C (at a minimum).

[47] www.ukgbc.org/wp-content/uploads/2021/11/UKGBC-Whole-Life-Carbon-Roadmap-A-Pathway-to-Net-Zero.pdf

Buildings 11. MCC to **increase capacity for enforcement** of Minimum Energy Efficiency Standards (MEES) in the private rented sector

Buildings 12. MCC to ensure planning and environmental health teams are fully conversant with low carbon retrofit measures, including air source heat pumps and external wall insulation, to **minimise barriers to their uptake**.

Buildings 13. MCCP to support **engagement with Manchester residents** to maximise uptake of retrofit actions, including through 'Your Home Better'.

Buildings 14. **Commercial landlords** to ensure energy monitoring and management processes are in place across their portfolio and to work transparently with tenants to minimise use, with requirements clearly set out in green leases.

To work at city-region level / with Greater Manchester partners on:

(Retrofit)

Buildings 15. ENWL[48] to work with local partners to drive **uptake of solar PV** in domestic and non-domestic properties.

Buildings 16. GMCA to fund dedicated support to the **green technology sector** to maximise economic benefits and job growth to Manchester.

Buildings 17. Skills providers to develop and roll out **regional upskilling** programmes for retrofit to ensure Manchester residents can benefit from the growth of this emerging market.

Buildings 18. Private sector organisations to incentivise and support green **apprenticeships**, building the local skills for net zero.

To advocate for national government to do:

(New build)

Buildings 19. Use national planning policy to better support net zero transition by adopting **whole life carbon standards for all new developments**, ensuring a level playing field for all locations.

Buildings 20. Adopt recommendations set out in UKGBC Roadmap to ensure building regulations require new buildings to adequately **predict or represent the actual performance** of operational carbon.

Buildings 21. Update the National Calculation Methodology (NCM, as underpinned by SAP) and the EPC methodology to create a fit-for-purpose **predictive methodology** for energy performance of dwellings, that better reflects in-use energy [49]

Buildings 22. Introduce a phased approach to mandatory energy efficiency **data disclosure** through performance-based rating schemes for existing non-domestic buildings in the public and private sector.

(Retrofit)

Buildings 23. Adopt a **National Retrofit Strategy[50]** and coordinate through a Retrofit Delivery Authority[51] to set out and deliver a national homes upgrade

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[48] Electricity North West Ltd
[49] https://www.ukgbc.org/wp-content/uploads/2021/11/UKGBC-Whole-Life-Carbon-Roadmap-A-Pathway-to-Net-Zero.pdf
[50] www.ukgbc.org/wp-content/uploads/2021/11/UKGBC-Whole-Life-Carbon-Roadmap-A-Pathway-to-Net-Zero.pdf
[51] https://www.constructionleadershipcouncil.co.uk/wp-content/uploads/2020/12/CLC-National-Retrofit-Strategy-final-for-consultation.pdf

programme, fully coordinated with local government, industry, and relevant stakeholders.

Buildings 24. Introduce **MEES on all tenures** at point of sale, including a retrofit assessment, with incremental increases over time from 2025, including funding to support enforcement.

Buildings 25. More **evenly distribute the environmental levies** placed on gas and electricity to incentive the electrification of heat and encourage low carbon heating uptake[52].

Buildings 26. **Reform EPC** to disincentive gas usage and act as a meaningful regulatory driver in reducing emissions.

Buildings 27. Implement a standardised **verification** and accreditation scheme for net zero retrofit.

Buildings 28. Tighten building regulations so that works to **existing dwellings** give clear triggers for energy improvement requirements.

Buildings 29. Introduce and clearly signpost a **cut-off date** of 2030 for the sale of gas and oil boilers.

Buildings 30. **Develop a 'skills card'** as a quality assurance scheme for heat pump installers, similar to the Gas Safe scheme.

Buildings 31. Deliver **upskilling campaigns** for relevant industry sectors (e.g., gas heating engineers) to remove barriers to the uptake of electrified and low carbon space heating, including heat pumps.

Buildings 32. Introduce **variable stamp duty rates** that are adjusted in line with the energy performance of buildings.

Buildings 33. **Remove VAT on refurbishment work** where energy performance targets are met.

Buildings 34. Introduce **direct grants for low-income** households to support retrofit.

Buildings 35. **Banking sector** to develop attractive financial offers for homeowners to overcome the high up-front capital costs of deep retrofit, e.g., low interest mortgage extensions and loans where performance targets are met.

Buildings 36. **Institutional investors** based in the UK to disclose the operational energy and carbon performance of property portfolios (at asset level) in annual reporting.

To do differently / opportunities to innovate:

Buildings 37. Property developers to deploy **digital twin technology** to increase our understanding of the financial viability of applying zero carbon standards to new builds.

Buildings 38. MCC to enable **accelerated planning approval** for early adopters of future energy efficiency levels (with disclosure of performance on completion).

Buildings 39. Developers to support **city-level second-hand materials markets** to drive circularity and material re-use in built environment sector.

Buildings 40. Local areas to develop a **place-based approach** to domestic housing decarbonisation that bundles multiple low carbon measures together, e.g.,

[52] https://www.heatpumps.org.uk/wp-content/uploads/2019/11/A-Roadmap-for-the-Role-of-Heat-Pumps.pdf

insulation, solar PV, and battery storage, with innovative financial models to attract private finance in to provide the upfront capital investment required.

Buildings 41. Social housing providers to explore opportunities for **collaborative procurement** of retrofit technologies (e.g., heat pumps) to obtain economies of scale and provide the retrofit market with a stable and sizable pipeline.

Buildings 42. Financial institutions and lenders to increase the availability of **green mortgages** with reduced rates for the most efficient homes to incentivise housing retrofit.

Buildings 43. Electrical product manufacturers to increase engagement with the Internet of Things (IoT), to enable greater uptake of **smart controls in homes**, helping to balance the grid and lower consumer fuel bills.

Buildings 44. Commercial building owners/managers to use **digital modelling tools** to simulate and evaluate retrofit options for Heating, Ventilation and Air Conditioning (HVAC) systems; significant upskilling will be required to mainstream these skills across the building services industry[53].

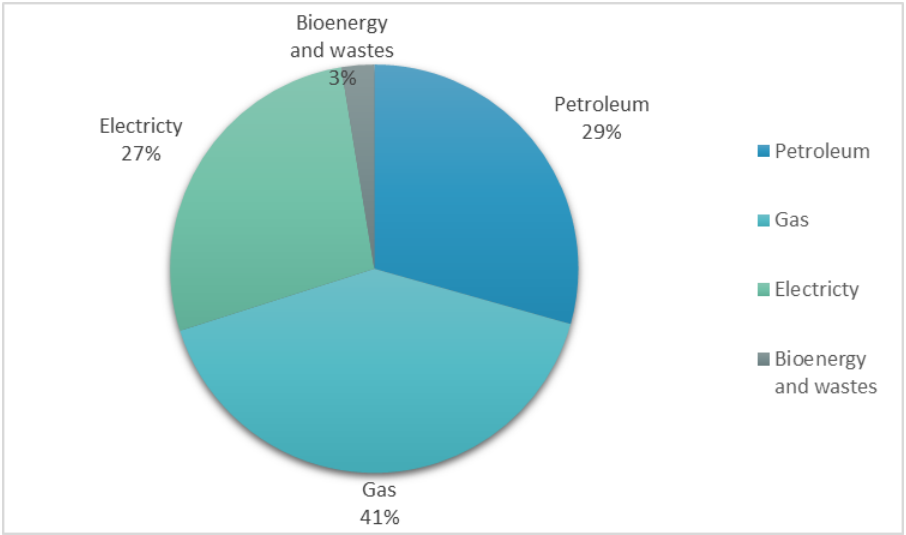
Buildings 45. Commercial property owners to **disclose energy efficiency performance data** to fixed standards such as NABERS, UKGBC, or BREEAM to enable benchmarking of building performance and drive retrofit across the sector.

2b. Renewable energy

Current energy mix

Graph XX shows Manchester's current energy mix. It is based on data from the UK government's Department of Business, Energy, and Industrial Strategy (BEIS) for 2019 (there is always a lag in energy and emissions data), and covers all activities that use energy: transport, buildings, and industry.

It shows we remain heavily reliant on gas, primarily for heating, and on petrol/diesel for road transport.



As we shift away from fossil fuels to a low carbon future, our demand for electricity will increase. In Manchester it is projected to almost double in the next 15 years[54].

To support this, we need to create a step-change in the scale of renewable energy that we generate.

[53] https://www.hvnplus.co.uk/news/much-more-to-do-to-upskill-sector-for-heat-pumps-experts-warn-28-05-2021/
[54] https://www.nationalgrideso.com/document/246851/download

Renewable energy generation

39.3% of UK electricity is now generated by renewables sources[55]. Manchester contributes only 0.06% of this[6]. Generation of electricity by solar PV in the UK has grown rapidly since 2010, increasing capacity from 95 MW to 13,800 MW at the end of 2021.

The production of renewable energy within Manchester's boundaries is below the national average at 2.7%[56] of demand. According to BEIS data for 2019, the 31 MW[57] generated in Manchester is broken down by technology type as follows:

- 22 MW from 6,800 solar PV installations
- 4.5 MW from 2 x anaerobic digestors
- 5.1 MW from 3 x plant biomass

In order to reach zero carbon

We need to see a **rapid shift away from fossil fuels** to electricity for heating, transport, and industry. To support this, we need to **increase renewable energy generation**, both locally and at national level.

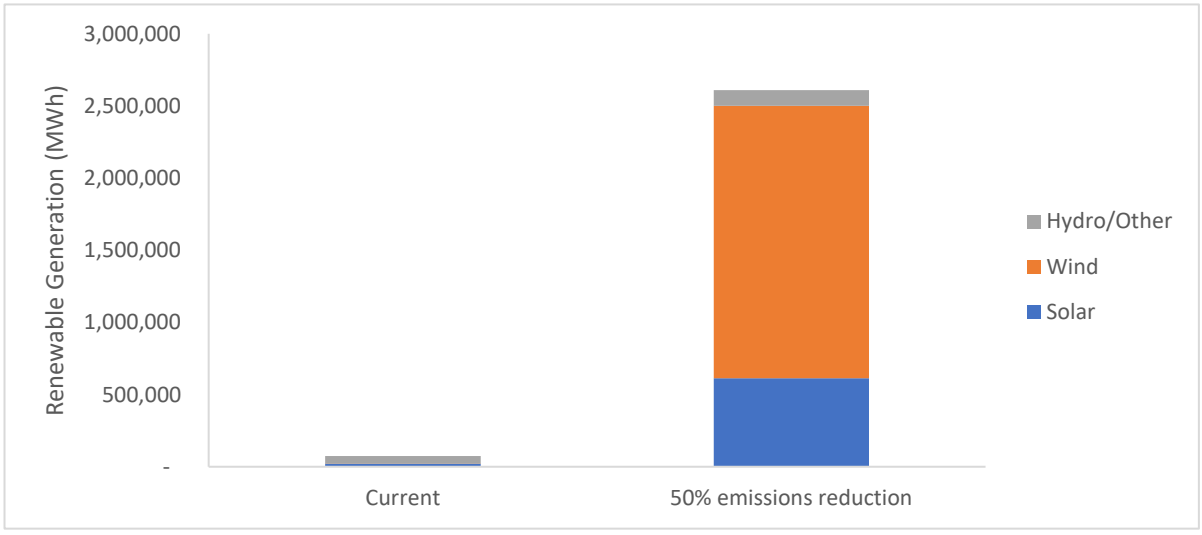
This needs to be coupled with a **step change in energy efficiency** across all sectors, and increased adoption of **smart grid** technologies and **local storage** to balance energy supply and demand for maximum efficiency.

Scale of action needed to reduce emissions by 50%:

Modelling by SCATTER indicates the following scale of action is needed.

- Manchester needs access to 1,534 MW of energy from renewable sources, a 35-fold increase from current levels.
- 35% of our renewable energy target can be produced within Manchester, predominantly from small-scale solar PV[58].

Graph XX below shows the scale of growth in renewable energy production needed.



[55] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1064765/Energy_Trends_March_2022.pdf
[56] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1030065/Renewable_electricity_by_local_authority_2014_to_2020_rev.xlsx
[57] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1030065/Renewable_electricity_by_local_authority_2014_to_2020_rev.xlsx
[58] Manchester Local Area Energy Plan* *link to be updated upon publication*

Increase in solar photovoltaic (PV) capacity

- 596 MW local, small-scale PV
- 600 MW large PV

Increase wind capacity

- 15 MW local onshore wind
- 9 MW large-scale onshore wind
- 312 MW from large-scale offshore wind

Other renewable technologies

- 0.3 MW small-scale hydroelectric

CO2 savings

If all these actions are achieved, there is a potential to cumulatively save **3,402k tCO_2e**

Costs and savings

The upfront capital cost of delivering this change is estimated to be **£644m**

- £345m – small-scale solar technology
- £12m – large-scale solar technology
- £167m – large-scale onshore wind
- £116m – large-scale offshore wind
- £3m – hydroelectric energy

The cumulative operational cost savings are estimated to be **£352m**

- £71m – small-scale solar technology
- £8m – large-scale solar technology
- £103m – large-scale onshore wind
- £169m – large-scale offshore wind
- £2m – hydroelectric energy

It should be noted that the upfront cost of generating renewable energy and the savings accrued are often incurred by different parties.

Potential Funding Sources:

- Smart Export Guarantee
- Electricity North West Powering our Communities Fund

More work is needed to develop new and innovative business models that can unlock private finance at scale (see section 7).

Other policy drivers and enablers

- Manchester Local Area Energy Plan.
- GMCA 5 year environment plan and Go Neutral[59] programme.
- ENWL and Cadent Roadmap to 2050[60].

[59] Blog - Go Neutral Smart Energy Programme | GM Green City
[60] https://www.enwl.co.uk/about-us/regulatory-information/our-business-plan-2023-2028/

- National Energy Security Strategy[61].
- Ofgem consultation on Local Energy Markets and Strategic Innovation Fund[62].

Challenges

- Lack of space for large scale solar or onshore wind in Manchester.
- Deployment of small-scale solar PV on commercial properties can increase business rates and disincentivise uptake.
- Development of smart, local area energy markets needs collaborative innovation and investment.
- Battery technologies are yet to catch up with solar PV in terms of efficiencies and price point.

Examples of good practice

- ENWL's Powering Our Communities Fund[63]
- MCC's large scale solar investment[64]
- Smart energy cities concept[65] as learnt through Manchester's 'Triangulum' project[66]

Co-Benefits of action - Links to other headline objectives

Adaptation and resilience

- Increasing local renewable energy supply provides energy security and resilience against future fossil fuel price increases.
- As the production of renewable energy (solar and wind power) requires negligible amounts of water, it does not contribute to water scarcity concerns.

Health and wellbeing

- Improved energy affordability can deliver health benefits by reducing the risks of illness due to living in inadequately heated homes.
- Renewable energy helps to reduce air pollution.

Inclusive, zero carbon and sustainable economy

- In the UK, low carbon and renewable energy activities generated £46.7bn[67] turnover in 2018, directly employing 224,800 people (full-time equivalents).
- In Manchester, energy efficiency, low carbon heat and electricity support and estimated 6,175 jobs across manufacturing, construction and retrofit[68].

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[61] https://www.gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy
[62] https://www.ofgem.gov.uk/publications/ofgem-launches-review-local-energy-system-operation
[63] https://www.enwl.co.uk/go-net-zero/community-and-local-energy/what-is-community-and-local-energy/case-studies/
[64] https://www.manchester.gov.uk/news/article/8927/solar_farm_plan_to_cut_council_greenhouse_gas_emissions_advances
[65] https://www.iea.org/reports/empowering-cities-for-a-net-zero-future
[66] https://www.manchesterclimate.com/content/triangulum-project
[67] https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/finalestimates/2018
[68] https://democracy.greatermanchester-ca.gov.uk/documents/s19616/DRAFT%20LSR%20update%20Feb22%20v9%20280222.pdf

Recommended Actions

Action needs to be taken by government at local and national level, by institutions and organisations in the private and voluntary sector, and by residents and communities across the city.

These recommended actions have been co-designed with stakeholders across the city to help enable everyone to play their full part in tackling the climate crisis and meeting the ambitious targets that Manchester has adopted.

To be delivered locally / direct control lies in Manchester:

Energy 1. ENWL to work alongside Manchester's public and private sectors and communities to **maximise investment in the city's electricity network** to enable an increase in local renewable energy generation and a rapid electrification of heating and transport.

Energy 2. Manchester City Council (MCC) to **set stretching requirements through the Local Plan** to increase renewable energy generation, for example:

a. Require a percentage of energy used on site by new builds to be from renewable energy or low carbon sources in the locality.

b. Ensure district heating is prioritised in population-dense areas and encourage large developments to require heat planning alongside master planning.

c. Allocate land for onshore wind where this is technically feasible.

d. Ensure policies for housing, transport and energy are considered together, for example through the Local Area Energy Plan.

Energy 3. Organisations in the **public and private sectors** (covering commercial, industrial and institutional buildings) to **maximise renewable energy generation on site** and explore off-site generation either through asset ownership or arrangements like power purchase agreements (PPA), with the aim to achieve 100% renewable electricity.

Energy 4. Social housing providers, owner-occupiers, and private landlords in the **domestic housing sector** to maximise renewable energy generation on site, including through community energy initiatives[69].

Energy 5. Manchester Climate Change Partnership (MCCP) to **work collaboratively** to increase renewable energy generation capacity across members' portfolios.

Energy 6. MCC to develop a **green skills action plan** to upskill and expand the green economy workforce, as outlined in the Work and Skills Strategy[70], ensuring residents can benefit from jobs growth in the renewable energy sector.

To work at city-region level / with Greater Manchester partners on:

Energy 7. GMCA to support development of pipeline of renewable energy projects as set out in LAEPs ensuring **coordination across the city region**[71]

Energy 8. ENWL to support delivery of a **smart, flexible, low carbon, energy grid** in Manchester.

[69] What is community energy? | Community Energy England
[70] https://www.manchester.gov.uk/info/200024/consultations_and_surveys/8359/new_work_and_skills_strategy_for_manchester_consultation
[71] https://democracy.greatermanchester-ca.gov.uk/documents/s19633/GM%20LAEPs.pdf

Energy 9. GMCA to support the development of **local energy markets**[72] that coordinate the generation, supply, storage, transport, and consumption of energy from decentralised energy resources, involving network utilities and energy companies.

Energy 10. GMCA to promote the 'Go Neutral'[73] framework to other sectors beyond the public estate.

Energy 11. GMCA to work with ENWL to support **resource and strategic planning** for network capacity applications across the ten districts.

Energy 12. GMCA to support Manchester partners to adopt a **'GM-first'** policy for renewable energy generation and setting higher ambition for net zero energy as set out in 'Places for Everyone'[74]

Energy 13. Higher education sector to develop and roll out a **regional upskilling** programme for renewable energy generation and local energy markets.

Energy 14. GMCA to support **owner occupiers** who are 'able to pay' to incorporate renewable energy projects into domestic retrofit through 'Your home better'[75].

Energy 15. ENWL to fund cooperative and **community energy** schemes for renewable energy generation[76].

Energy 16. GMCA to work with Manchester on delivering **campaigns to residents and businesses** to encourage installation of renewable energy generation.

Energy 17. To encourage Manchester **businesses** to engage with relevant initiatives including the Energy Innovation Agency and the GM Business Growth Hub to explore opportunities for diversification into the green technology and services sector.

To advocate for national government to do:

Energy 18. Increase the availability of **development finance and capacity** to local areas to accelerate development of renewable energy projects suitable for green funding (potentially through UKIB)[77].

Energy 19. Consider bringing forward **subsidy schemes** to support local energy generation and battery storage.

Energy 20. **Change the environmental levies** on the electricity bill into a carbon levy on electricity, gas and oil bills, based on their carbon impacts - as per CCC recommendation[78]

Energy 21. Confirm policy position to support **hydrogen and industrial heat pumps** to incentive industrial heat and process decarbonisation.

Energy 22. Clarify or include energy projects as a suitable category in **future lending terms for PWLB** to enable local authorities to access low-cost investment finance for energy projects.

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[72] https://www.greatermanchester-ca.gov.uk/what-we-do/environment/energy-supply/
[73] https://democracy.greatermanchester-ca.gov.uk/documents/s18852/07a%20Go%20Neutral%20Update.pdf
[74] https://www.greatermanchester-ca.gov.uk/GMCAFiles/PFE/Supporting%20documents/04%20Sustainable%20and%20Resilient%20Places/04.01.05%20Carbon%20and%20Energy%20Topic%20Paper.pdf
[75] https://www.greatermanchester-ca.gov.uk/what-we-do/environment/homes-workplaces-and-public-buildings/retrofitting/
[76] https://www.enwl.co.uk/go-net-zero/community-and-local-energy/supporting-community-energy/
[77] https://www.ukib.org.uk/strategic-plan
[78] www.theccc.org.uk/wp-content/uploads/2020/12/Local-Authorities-and-the-Sixth-Carbon-Budget.pdf

Energy 23. **Increase powers and resources** for local authorities to deliver systems-based, area-wide planning for net zero, to require buildings to connect to district heat schemes, and to increase scale of renewable energy projects.

Energy 24. **Reduce business rates and VAT on private wire solar** to remove unintended barriers to uptake of renewable energy by the private sector.

Energy 25. Introduce a **carbon intensity limit** on power generation[79].

To do differently / opportunities to innovate:

Energy 26. Use open access **digital technology** to enable residents and businesses to more easily assess the suitability of their property for renewable energy generation, to help increase deployment.

Energy 27. Launch a **local climate bond**[80], based around the UK Green Taxonomy criteria, that raises finance for local renewable energy projects.

Energy 28. Innovate and advocate for research into **small-scale wind generation** that could be deployed across the city.

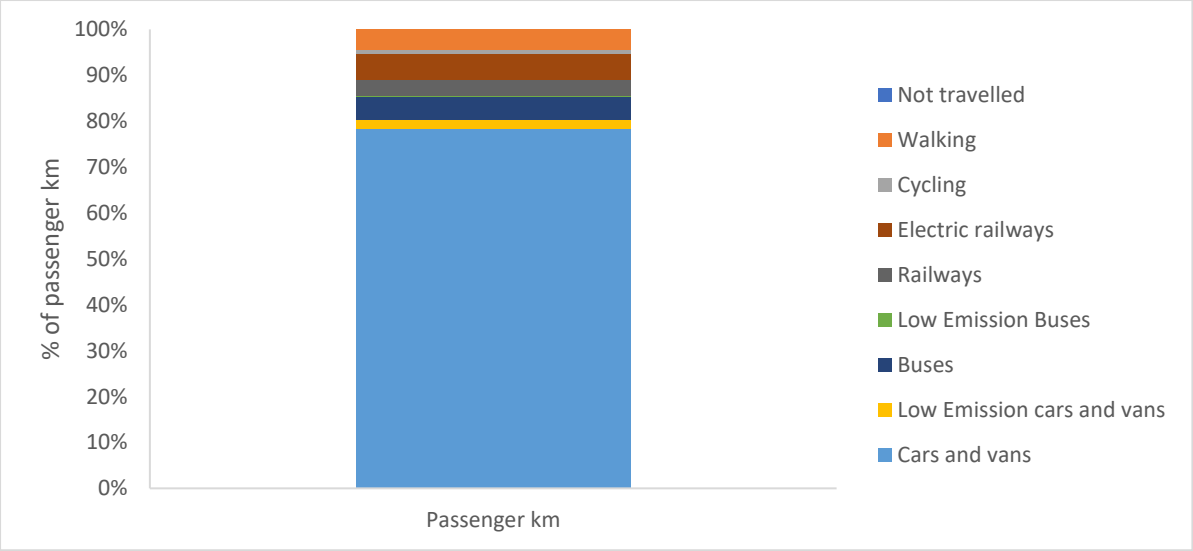
Energy 29. GMCA to utilise devolved skills functions and the newly created **GM Energy Innovation Agency** to support growth in the local green economy, with a focus on increasing renewable energy generation and decarbonising buildings and transport[81].

2c. Transport

Current emissions

Transport is responsible for 24% of Manchester's direct emissions. Within that, 95% of emissions are from on-road vehicles: cars, buses, vans, and motorbikes.

Graph XX below shows the percentage of passenger kilometres travelled in 2018 by mode of transport. This tells us how we travel. The spread of carbon emissions will differ slightly from this as some of the km will be via low-carbon modes of transport such as electric cars.



[79] https://www.nationalgrideso.com/future-energy/net-zero-explained/what-carbon-intensity
[80] https://www.greenfinanceinstitute.co.uk/news-and-insights/local-climate-bonds-a-cost-effective-way-to-raise-billions-for-councils-green-plans-says-new-campaign/
[81] https://www.energyinnovationagency.co.uk/

Over the last 30 years, transport emission reductions have not reduced at the same rate as other sources of greenhouse gas emissions. There are several reasons for this, including:

- Population growth
- Increased disposable income
- Increased length of journeys
- Falling relative cost of motoring – 15% down in real terms over the last twenty years
- Increased cost of rail fares – risen by over 20% in twenty years
- Increased bus and coach fares – risen by over 40% in twenty years[82]
- Shift towards large vehicles – 31% of new car sales are classed as large vehicles compared to 21% in 2010[83]

In Manchester:

- At the end of 2021, there were only 1,454 ultra-low emissions vehicles registered, which is below the national average[84].
- Most buses are still running on diesel[85].
- 36% of all trips that start in Manchester are neighbourhood trips under 2kms and could be walked in around 20 minutes or less[86].
- There remains a paucity of public transport options to tackle Manchester's growing night-time economy in comparison with larger cities like London.

In Greater Manchester:

- Too many short trips are made by car - 30% of trips under 1km and 62% of trips between 1 and 2km.
- We are behind both the UK and the North West average for installing electric vehicle charging infrastructure[87].

However, there are some positive trends:

- In 2019, 78% of peak morning travel (over 108,000 journeys) into Manchester city centre was made by public transport (63%) or active travel (15%)[88].
- In the decade leading up to 2019, there was a 19% reduction in the number of cars entering the city centre at peak morning travel time (reducing from over 27,000 to under 23,000)[89].
- As a result of changes caused by the Covid-19 pandemic, there has been an increase in hybrid working which is predicted to cause commuting to fall by 1 in 10 journeys as we move away from the 5-day commuting week[90].
- Between 2010 and 2020 the size of the Metrolink network was tripled, converting many city-centre bound journeys from car to public transport. In 2019 Metrolink accounted for 16% of peak morning journeys[91].

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82 Decarbonising Transport – A Better, Greener Britain (publishing.service.gov.uk).
83 Reducing UK emissions, 2019 Progress Report to Parliament, Committee on Climate Change, July 2019
84 Vehicle licensing statistics data tables - GOV.UK (www.gov.uk)
85 https://www.businessgrowthhub.com/green-technologies-and-services/green-intelligence/resource-library/greater-manchester-set-for-europe-leading-e-bus-fleet
86 https://tfgm.com/our-five-year-transport-delivery-plan
87 https://electrictravel.tfgm.com/greater-manchesters-ev-strategy/
88 City Centre Transport Strategy to 2040
89 City Centre Transport Strategy to 2040
90 https://democracy.greatermanchester-ca.gov.uk/documents/s8356/GMTC%2020200710%20Transport%20Recovery%20Report.pdf
91 City Centre Transport Strategy to 2040

In order to reach zero carbon

We need to **travel less** and **change the way we travel**, ensuring we chose the right type of transport for each journey, prioritising active travel (walking and wheeling) and public transport, particularly for short trips.

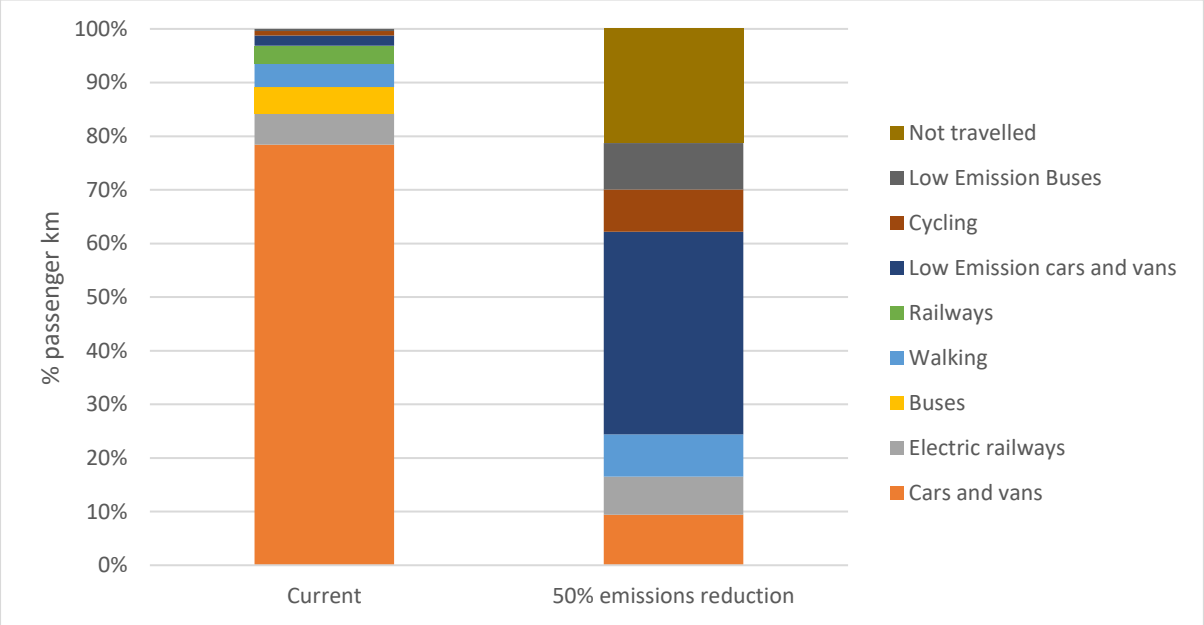
We need to rapidly reduce our dependency on fossil fuels and **deploy electric vehicles** at scale for public and private transport.

Scale of action needed to reduce emissions by 50%:

Modelling by SCATTER indicates the following scale of action is needed.

- 30% reduction in overall distance travelled – we need to travel less for example by more homeworking, accessing services remotely, and making more use of use of local facilities and services.
- 20% of journeys need to be made by active travel – walking or cycling/wheeling.
- 20% of journeys needs to be made by public transport.
- 9% reduction in freight mileage and 71% increase in freight fuel efficiency.
- 80% of remaining passenger miles that are by cars, vans and motorbikes need to be in electric or hybrid electric vehicles.

Graph XX shows the modal shift in passenger miles needed to meet a 50% reduction in direct emissions.



CO2 savings

The estimated CO2 savings from delivering all the above actions is **1,360ktCO$_2$e**

Costs and savings

The upfront capital cost of delivering this change is estimated to be **£398m**

- £325.9m – purchase of new electric vehicles
- £16.3m – electric vehicle charging infrastructure
- £38m – electrification of buses and the associated charging infrastructure
- £17m – electrification of rail and the associated rail infrastructure

Operational cost savings are estimated to be **£362m**

- £244m savings – reduced running cost of electric vehicles
- £22m savings – reduced running cost of electric buses
- £21m savings from electrified trains
- £94m revenue savings from freight mileage reduction

It should be noted that the upfront cost of decarbonising transport and the savings accrued from modal shift are often incurred by different parties.

Potential funding sources:

TfGM have been successful in securing £1.07bn from the Government's City Region Sustainable Transport Settlement[92] and a report to GMCA on 24th June 2022 sets out an allocation from City Region Sustainable Transport Settlements (CRSTS) of £115m. £90m will be provided for Zero Emission buses and £25m for fixings and fittings in depots to charge them.

Other funding that could support the city's transition includes:

- DfT Active Travel Capability Fund[93]
- DEFRA Air Quality grant programme[94]
- OZEV Electric Vehicle Charge-point Grant[95]
- OZEV Workplace Charging Scheme[96]
- GM Active Travel Fund[97]

Other policy drivers and enablers

Manchester City Centre Transport Strategy[98] is focused on delivering a net-zero carbon transport system and includes the following targets (from a 2019 baseline):

- Reduce car journeys to 10% by 2040, compared to 21%.
- Increase public transport trips into the city centre by around 50% (Metrolink), over 50% (bus) and around 90% (rail) by 2040.
- Increase walking and cycling trips by around 70%.

The Manchester Local Area Energy Plan (LAEP) calls for:

- 72,000 electric vehicle charging points to be installed at a cost of £40 million.

The Greater Manchester transport strategy 2040 sets ambition for:[99]

- 50% of all journeys to be by public transport or active travel by 2040.

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[92] https://www.gov.uk/government/publications/city-region-sustainable-transport-settlements-confirmed-allocations
[93] https://www.gov.uk/government/publications/capability-fund-local-transport-authority-allocations
[94] https://www.gov.uk/government/collections/air-quality-grant-programme
[95] https://www.gov.uk/government/collections/government-grants-for-low-emission-vehicles#ev-chargepoint-grant
[96] https://www.gov.uk/guidance/workplace-charging-scheme-guidance-for-applicants
[97] https://www.gmconsult.org/strategy-team/gmactivetravelfundschemes/
[98] https://assets.ctfassets.net/nv7y93idf4jq/6HANAC6XKWnyvZ508tbVfq/f661cc31bad890a4f388de49e79c1826/CCTS_Full_Document_Final_170321.pdf
[99] https://tfgm.com/2040-transport-strategy

- 1 million more active travel and public transport journeys per day by 2040.
- No net increase in motor vehicle traffic and 200,000 more EVs by 2040.

The Greater Manchester Streets for All Strategy[100] sets out a vision to ensure that our streets are welcoming, green, and safe spaces for all people that enable more travel by walking, cycling and using public transport and create thriving places that support local communities and businesses[101]

Nationally there are commitments for:

- 50% of all journeys in towns and cities to be walked or cycled by 2030[102].
- No sales of cars and vans with only a petrol or diesel engine after 2030 and no sales of new fossil fuel vehicles (including hybrids) after 2040[103].

Challenges

- To make walking the natural choice, people need safe, inclusive, and attractive walking routes.
- To enable more people to cycle, there needs to be high quality, connected and safe cycling infrastructure, people need to be able to access a bike and have a place to safely park/store it.
- To encourage people to access more services and activities online, instead of travelling, we need to ensure digital skills and technologies are widely available.
- The space needed to deliver more priority for active travel and public transport infrastructure may be constrained in the city centre and some built-up residential areas, and will, in some cases, require road space to be reallocated away from general traffic towards the most space-efficient and sustainable modes[104].
- There are some systemic barriers to using public transport, such as safety and security to lone passengers, particularly women, which need to be addressed to enable modal shift.
- As we switch away from fossil fuels to electric vehicles, the demand for electricity needs to be met by sufficient increased supply.
- Electric vehicles have a higher upfront cost than most petrol or diesel vehicles.
- Switching large numbers of cars to electric reduces direct emissions in operation but results in an increase in embodied carbon through mass production.
- Delivering the infrastructure needed to support behaviour change requires a significant scale and pace of change, which presents challenges in terms of capacity of local government and delivery authorities, and due to the inherent difficulties of delivering infrastructure within an existing system.
- Revenue funding is needed to maintain integrated transport systems, including cycle infrastructure and footpaths, not just the upfront capital cost of infrastructure.

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[100] Streets for All | Transport for Greater Manchester (tfgm.com)
[101] https://downloads.ctfassets.net/nv7y93idf4jq/7FiejTsJ68eaa8wQw8MiWw/bc4f3a45f6685148eba2acb618c2424f/03._GM_2040_TS_Full.pdf
[102] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1009448/decarbonising-transport-a-better-greener-britain.pdf
[103] https://www.gov.uk/government/publications/transport-decarbonisation-plan
[104] https://bettertransport.org.uk/sites/default/files/research-files/Sustainable-Transport-and-the-NPPF.pdf and Streets for All | Transport for Greater Manchester (tfgm.com)

Co-benefits of action - Links to other headline objectives

Adaptation and resilience

- Creating new transport infrastructure for active travel and public transport brings the opportunity to increase tree planting and to embed sustainable urban drainage systems, building resilience to climate risk within our critical infrastructure.

Health and wellbeing

- Increased active travel improves health and could save the NHS £17bn within 20 years by reducing prevalence of type 2 diabetes, dementia, heart disease and cancer[105].
- A more integrated and affordable public transport system can save households money on owning and running a car, significant as the cost of living rises[106].
- Reduced use of internal combustion engine cars, vans and motorbikes improves air quality and reduces the negative health effects of air pollution.
- Electric vehicles are cheaper to run and usually cheaper to service and maintain[107].

Inclusive, zero carbon and sustainable economy

- The need to create new infrastructure for sustainable travel and electric vehicles is a new opportunity for jobs and business growth – for example, a report by Transition Economics for the TUC suggests investing in the electrification of transport could help deliver 59,000 new jobs in the UK[108].
- An integrated public transport system and active travel network can reduce the undesirable impacts of congestion on business and help drive economic growth[109].
- By changing how we move goods around the city, particularly in 'last mile' delivery, we can create opportunities for new business - a report by Accenture notes that, creating local fulfilment centres to support the 'last-mile' supply chain could create jobs and lower last-mile emissions between 17-26% by 2025[110].

Examples of good practice

- The Bee Network aims to provide a fully integrated active travel and public transport system joining together cycling, buses, trams and walking by 2024, with rail incorporated by 2030, to transform how people travel in Greater Manchester.
- A cycle hire scheme with over 1,200 pedal bikes and 300 e-bikes[111] is available across Manchester, Salford and Trafford.

[105] https://www.sustrans.org.uk/media/4471/4471.pdf
[106] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/953951/Transport_and_inequality_report_document.pdf
[107] https://www.buyacar.co.uk/cars/economical-cars/electric-cars/650/cost-of-running-an-electric-car
[108] https://www.tuc.org.uk/research-analysis/reports/rebuilding-after-recession-plan-jobs
[109] Streets for All | Transport for Greater Manchester (tfgm.com)
[110] https://www.accenture.com/_acnmedia/PDF-148/Accenture-Sustainable-Mile-POV.pdf
[111] Cycle Hire | TfGM Bee Active

Recommended Actions

Action needs to be taken by government at local and national level, by institutions and organisations in the private and voluntary sector, and by residents and communities across the city.

These recommended actions have been co-designed with stakeholders across the city to help enable everyone to play their full part in tackling the climate crisis and meeting the ambitious targets that Manchester has adopted.

To be delivered locally / direct control lies in Manchester:

Transport 1. Businesses to adopt policies that encourage **business travel** to be done via sustainable transport options and enable virtual working.

Transport 2. Businesses to encourage and **incentivise employees to commute via sustainable modes of travel** (including walking, cycling, public transport, and car sharing).

Transport 3. Businesses to **shift their fleet to electric vehicles** and install electric vehicle charging points as appropriate to their location, ensuring they avoid encouraging unnecessary car travel into local centres.

Transport 4. **Logistics companies** to reduce fuel use, increase fuel efficiency, and explore alternative vehicles.

Transport 5. **Schools to encourage walking and cycling** to school via road safety education campaigns and school street schemes.

Transport 6. **Residents to change the way we travel**, ensuring we chose the right type of transport for each journey, prioritising active travel (walking and wheeling) and public transport, particularly for short trips.

Transport 7. **Cultural, leisure and tourist destinations** to provide readily accessible information on how visitors can reach them by public transport or active travel and explore incentives to discourage car travel.

Transport 8. Manchester Climate Change Partnership (MCCP) to deliver collaborative **behaviour change campaigns** to encourage use of active travel, public transport and shared modes of transport, such as car clubs and cycle hire schemes, through its networks.

Transport 9. Manchester City Council (MCC) to deliver more **active travel infrastructure** and develop new schemes that **integrate sustainable transport choices**, including e-mobility, and **smart logistics** into neighbourhoods like the Ancoats Mobility Hub.

Transport 10. MCC to adopt the principles of the **15/30-minute neighbourhood** within planning policy to ensure residents can access essential services without the need for a car.

Transport 11. MCC to **reallocate road space** on appropriate parts of the network to support the delivery of infrastructure for more sustainable modes of transport, including buses, walking, and cycling/wheeling, and gradually **remove inner city centre parking supply** as sustainable travel options are improved

Transport 12. MCC to implement **reductions in speed limits** across the city to help reduce emissions and support delivery of road safety programmes.

Transport 13. MCC to target reductions in the **carbon impact of construction and maintenance** of highways.

Transport 14. MCC to develop and implement a strategy for electric vehicle charging infrastructure, including within car parks, and set requirements for **electric vehicle charging infrastructure to be integrated** within new residential, workplace and commercial developments.

To work at city-region level / with Greater Manchester partners on:

Transport 15. Deliver the **Streets for All** strategy[112] and **Bee Network** ambition for an integrated, affordable, and sustainable transport system which will join up buses, trams, cycling and walking by 2024 and rail by 2030.

Transport 16. Investigate and implement cutting edge **smart transport solutions**, getting the most out of digital technology to improve our understanding of travel patterns, and improve physical and digital integration of low-carbon modes[113].

Transport 17. Increase the number of **zero emissions buses** and transition to an electric bus fleet.

Transport 18. Deliver the **GM Clean Air Plan** to improve air quality.

Transport 19. **Minimise embodied carbon in new transport infrastructure** and vehicles under best practice guidance like the PAS2080 carbon management standard.

Transport 20. **Incentivise sustainable travel** behaviour change and deliver public transport and active travel schemes into and within the city centre, targeting 90% of all morning peak trips to the city centre by public transport or active travel.[114]

Transport 21. Support improvements to distribution, delivery, service, and logistics activities that **reduce heavy goods vehicle emissions** using traffic powers, restricting vehicle type, weight and delivery times in specific areas, as outlined in its Freight and Logistics Strategy.[115]

Transport 22. Deliver **awareness raising campaigns** and initiatives in collaboration with local partners to enable all businesses and residents to take tangible actions to reduce transport emissions.

To advocate for national government to do:

Transport 23. Provide **long-term, multi-year devolved capital funding** to allow Greater Manchester to invest in smart and sustainable transport solutions, including active and public transport and fleet transition.

Transport 24. Provide **additional revenue funding for capacity and capability** at the local level to enable planning and delivery of local climate change strategies.

Transport 25. Provide **integrated funding for decarbonised transport** as recommended in the National Audit Office report.[116]

Transport 26. Review the most effective range of **tax measures**, including VAT, to incentivise and drive uptake of zero emission vehicles.

Transport 27. **Reallocate some of the resources** of the national road building budget **to** road safety and sustainable travel schemes.

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[112] https://tfgm.com/strategy/streets-for-all
[113] https://tfgm.com/city-centre-transport-strategy and https://downloads.ctfassets.net/nv7y93idf4jq/7FiejTsJ68eaa8wQw8MiWw/bc4f3a45f6685148eba2acb618c2424f/03._GM_2040_TS_Full.pdf
[114] https://democracy.manchester.gov.uk/documents/s31521/City%20Centre%20Transport%20Strategy%20Update.pdf
[115] https://tfgm.com/freight
[116] https://www.nao.org.uk/report/local-government-and-net-zero-in-england/

Transport 28. Work collaboratively with local partners on **reducing emissions across the strategic and local roads networks**[117].

Transport 29. Introduce legislation to **phase out new sales of diesel buses** and coaches by 2040 at the latest, as has been done with cars (2035)[118].

Transport 30. Publish the **Local Authority Transport Toolkits** to support identification and assessment of local transport decarbonisation strategies.

Transport 31. Reinforce active travel and travel decarbonisation messages in **national behaviour change campaigns** and provide funding for local campaigns to support this work[119].

Transport 32. Introduce grants for second hand electric vehicles purchases, **helping lower income households** and small businesses.

To do differently / opportunities to innovate:

Transport 33. To enable more flexible and hybrid working patterns, introduce **new flexible travel initiatives** like the Metrolink Clipper Card.

Transport 34. Work collaboratively with local businesses to **integrate sustainable last mile logistics** in the city, e.g., through shared local logistics hubs.

Transport 35. Expand options for **electric shared mobility schemes**, including car clubs, bikes, scooters, and e-cargo bikes.

2d. Aviation emissions

Sub-objective:

We want the emissions from all flights from Manchester Airport to be fully aligned with the Paris Agreement. We believe this means operating within a limited carbon budget for UK aviation, as part of a wider international budget.

Current emissions

Whilst aviation emissions are not part of Manchester's carbon budget, it is recognised that aviation emissions must be tackled as part of ensuring that the city, and the UK overall, play their full part in delivering the Paris Agreement.

The 2021 Manchester Climate Change Annual Report [120] outlined the impact of the Covid-19 pandemic on aviation emissions, with emissions from Manchester airport reducing by 91% in 2020 compared to 2019, and emissions from UK airports falling by 75% over the same period.

Now that lockdowns and travel restrictions have lifted, we fully expect to see an upturn in aviation emissions to be reported in the 2022 Annual Report.

In order to reach zero carbon

We need to **work collaboratively** across the aviation industry, with national government and international partners to ensure aviation emissions are reduced in line with the Paris Agreement.

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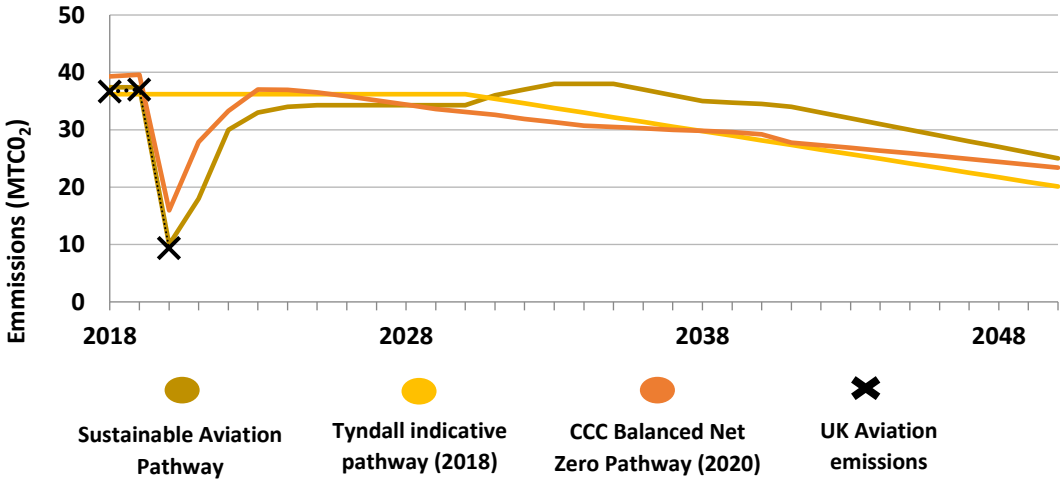
[117] https://nationalhighways.co.uk/netzerohighways/
[118] https://www.gov.uk/government/consultations/ending-the-sale-of-new-diesel-buses/ending-of-the-sale-of-new-diesel-buses
[119] https://news.tfgm.com/news/half-of-respondents-to-greater-manchester-survey-open-to-walking-and-cycling-more-post-pandemic
[120] MCCA Annual Report 2021 Final.docx (manchesterclimate.com)

We need to **enable residents and businesses to make informed choices** about their travel behaviours, including an understanding of the climate impacts.

Other policy drivers and enablers

- Decarbonisation Roadmap: A Path to Net Zero[121] – a report from Sustainable Aviation, a coalition of UK airlines, airports, and manufacturers, that outlines how the UK aviation industry can achieve net zero by 2050 including through sustainable aviation fuels, introduction of known and new more efficient aircraft, and better air traffic management and operating procedures. Interim targets were also published[122].
- Flightpath to the future: a strategic framework for the aviation sector[123] – sets out the commitment to include international aviation and shipping emissions in the UK's sixth carbon budget (2033-2037) for the first time.
- The Climate Change Committee's Sixth Carbon Budget[124] – recommended that aviation emissions in 2030 should be 20% below 2019 levels, without carbon offsetting or removal.
- Jet Zero Council – a partnership between industry and government with the aim of achieving zero emission transatlantic flight within a generation and delivering new technologies and innovative ways to cut aviation emissions. MAG are represented on this Council and the Jet Zero Strategy is due to be published in 2022.

Graph XX shows the emission reduction pathways proposed for UK aviation by Sustainable Aviation and the CCC alongside the indicative pathway developed by the Tyndall Centre.



Challenges

- There are challenges for all cities like Manchester in reconciling their climate change responsibilities with having a major international airport, that brings significant employment, business, cultural and tourism benefits, within its boundaries.

[121] SustainableAviation_CarbonReport_20200203.pdf
[122] https://www.sustainableaviation.co.uk/news/uk-aviation-industry-strengthens-commitment-to-achieving-net-zero-and-launches-first-interim-decarbonisation-targets/
[123] Flightpath to the future: a strategic framework for the aviation sector - GOV.UK (www.gov.uk)
[124] https://www.theccc.org.uk/publication/sixth-carbon-budget/

- Regional policies that unilaterally impose costs in one region that are not shared nationally or internationally can distort the aviation market, resulting in emissions being displaced to another city, as travellers chose a different airport, rather than creating a reduction in aviation emissions. As such, decarbonising aviation must be tackled collectively at a national and industry-wide level.

Examples of good practice

- Manchester Airports Group (MAG) has reduced carbon emissions across its estate and all MAG airports are certified as carbon neutral, including Manchester Airport. MAG has also committed to being net zero by 2038.[125]
- The infrastructure to access the airport, and Airport City, has been made more accessible via public transport and walking and cycling, including a new pedestrian and cycle bridge over the motorway link, enabling more sustainable transport choices to be made when travelling to/from the airport.

Recommended Actions

To support the common aim of establishing Manchester Airport, and the city of Manchester, as a national and international leader in sustainable aviation, Manchester Climate Change Partnership has worked together to develop and commit to the following agreement:

To work with the UK Government and other stakeholders to ensure that emissions from flights are kept within a carbon budget for UK aviation that is fully aligned with the Tyndall budget and the Paris Agreement (the "UK Aviation Budget"). This includes flights by Manchester citizens, businesses and other organisations, and all flights from airports in which the city has a stake.

As with the Manchester Climate Change Framework as a whole, the following principles underpin our approach to this sub-objective:

- *The principle of urgency, to ensure that high impact actions are taken in the short term to minimise cumulative emissions and their climate effects.*
- *The precautionary principle, to ensure that we are confident of remaining within the UK Aviation Budget by only adopting proven measures, while also supporting research into innovative approaches that do not rely on carbon offsetting or speculate on future technologies that may not deliver the reductions required.*
- *The principle of equity, to ensure fair access to transport and an equitable distribution of the remaining global carbon budget.*

To meet this sub-objective, we will pursue the following actions:

- *Empower citizens, businesses, and other organisations to understand the climate impact of their aviation practices and take action to reduce it*
- *Engage and collaborate with national government, regulatory agencies, other cities and the industry to ensure aviation emissions remain within the UK Aviation Budget*
- *Monitor progress through emissions reporting and budgeting, track the contribution of mitigation measures, and periodically review the underpinning science*
- *Recommend actions to ensure that the city plays its fair part in keeping aviation emissions within the UK Aviation Budget, while mitigating the risk of redistributing flights, emissions and associated social and economic benefits*

[125] https://democracy.manchester.gov.uk/documents/s30609/Aviation%20and%20Carbon%20Emissions.pdf

In support of this agreement, Manchester Climate Change Agency will engage with members of the Core Cities network, especially those with an airport within their boundaries, to develop a common approach to aviation emissions.

2e. Indirect / consumption-based emissions

Sub-objective:

To better understand the broader climate change impact of the city's consumption of goods and services and take action to develop more sustainable consumption practices for the city's residents and organisations.

The Climate Change Framework states that the greenhouse gas emissions from goods and services consumed in Manchester contribute to the city's overall climate impact, even though they may have been made elsewhere in the UK or globally.

Our consumption-based emissions are from the things that we buy and ultimately dispose of, for example, food, clothes, phones, electrical equipment, furniture, other manufactured goods, and construction materials.

As part of building a thriving and sustainable city, we need to promote resource productivity within our businesses, encourage more circular business models and the use of more sustainable materials, and eliminate waste by designing it out at source. These actions will stimulate innovation, skills development, and the growth of green jobs.

At the same time, we need to change the way that we behave as consumers and how we treat products at the end of their life.

Our indirect emissions may be 60% greater than our direct emissions but are more difficult to assess accurately than direct emissions, particularly at city-scale, and so target-setting and monitoring is not yet possible.

Update on research

Recent research by the University of Manchester is helping to provide a more detailed understanding of our consumption-based emissions in order that we may take action to reduce them; this was published in the city's 2021 Annual Climate Change Report[126].

In summary, this research shows that Manchester's consumption-based emissions footprint was estimated to be 3.3m tCO2e in 2017 and 3.12m tCO2e in 2019; with an average per capita footprint of 5.6 tCO2e. It also identified several hotspots[127] where action should be focused to deliver the greatest impact: food and drink, construction, waste and wastewater, and transport beyond the city; and did a deep dive on the role of food in particular[128].

In order to reach zero carbon

The **consumption-based emissions of cities need to half by 2030**, before halving once again by 2036, and finally stabilising at 0.7tCO2e per capita by 2050[129].

We need to **produce goods and services more sustainably**, moving to a circular economy, alongside becoming more **sustainable consumers**.

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[126] https://www.manchesterclimate.com/sites/default/files/MCCA%20Annual%20Report%202021%20Final.pdf
[127] https://www.manchesterclimate.com/sites/default/files/Decarbonising%20Consumption%20in%20Manchester_0.pdf
[128] https://www.manchesterclimate.com/sites/default/files/Sustainable%20Food%20Mission_Part%201_Final_1.pdf and https://www.manchesterclimate.com/sites/default/files/Manchester%20Food%20Mission_Part%202_Final.pdf
[129] 2270_C40_CBE_MainReport_250719.original.pdf

We must **reduce waste**, including unnecessary **food waste,** and manage unavoidable waste as sustainably as possible, maximising reusing and recycling.

Scale of action identified by SCATTER:

SCATTER's ability to model indirect emissions is more restricted than for direct emissions and so the targets it produces are limited to waste and food.

Things we buy and throw away

- 24% reduction in the volume of waste
- 15% increase recycling rates

Food

- 20% reduction in the amount of meat and dairy in food and supply chains
- 50% reduction in food waste

Other policy drivers and enablers

- Greater Manchester's 5-year Environment Plan[130] sets four priorities related to reducing emissions from the production and consumption of resources: producing goods more sustainably, being responsible consumers, managing waste sustainably and reducing unnecessary food waste. It is also targeting a recycling rate of 65% by 2035 across the city region.
- DEFRA's Resources and Waste Strategy[131] has been designed to accelerate the transition to a circular economy, to support an effective domestic recycling infrastructure and to tackle the challenges of plastic pollution and food waste. It's 25 Year Environment Plan[132] also targets a doubling of resource productivity by 2050.
- Climate-related disclosures are already mandatory for large businesses and the UK government is exploring whether indirect emission should be included in future to help drive increased resource efficiency and reduce waste.
- A recent Food Strategy policy paper[133] sets the objective to reduce greenhouse gas emissions and the environmental impacts of the food system, in line with the UK's net zero commitments and biodiversity targets and preparing for the risks from a changing climate

Challenges

- Cities often have little direct influence over indirect emissions; for example, it is not possible to control the carbon intensity of power used in the manufacturing process of an imported product, or how that product is transported.
- Individual consumers cannot change the way the global economy operates on their own, however, they can exercise some choice over what they buy.
- Manufacturing businesses within a value chain often have limited power to change a product's design or packaging; the shift to more circular economies requires collaboration across parties within these chains.

[130] 5-year-plan-branded_3.pdf (greatermanchester-ca.gov.uk)
[131] Resources and waste strategy: at a glance - GOV.UK (www.gov.uk)
[132] At a glance: summary of targets in our 25 year environment plan - GOV.UK (www.gov.uk)
[133] Government food strategy - GOV.UK (www.gov.uk)

- Indirect emissions are more difficult to estimate and monitor, meaning that identifying actions and tracking progress is not as accessible as for direct emissions; this applies to cities, and to large and small organisations and individuals.

Examples of good practice

- Many members of Manchester's Climate Change Partnership are working to reduce their indirect emissions, for example Manchester City Football Club are working to become a zero waste organisation[134].
- Small and medium-sized organisations in Manchester have access to a coordinated range of support services to help them improve their resource efficiency. These services can be accessed via the Bee Net Zero website[135]
- There are multiple projects in Manchester that support residents and communities to grow their own food and cook healthy, sustainable meals, helping to reduce food waste. These include Real Food Wythenshawe[136], Manchester Healthy Schools[137] and Growing Manchester[138].TH
- Manchester Climate Change Agency's 'In Our Nature' programme supported the launch of community fridges in Moss Side, Wythenshawe, Crumpsall and Failsworth to stop food ending up in the bin[139].
- Manchester City Council's procurement policy includes a 10% weighting for environmental performance to help drive reductions in indirect emissions through the public sector supply chain.
- Plastic Free GM is a campaign to ask businesses, organisations, and individuals to pledge to eliminate avoidable single use plastics[140].
- Three Renew Shops have been opened across Greater Manchester in a partnership between GMCA and Suez. They sell pre-loved household items that have been donated by residents at their local waste recycling centre[141].
- WRAP[142], the waste and resources action programme, delivers research, technical advice, case studies, and sectoral support to help change the way things are produced, consumed, and disposed of.

Co-benefits of action - Links to other headline objectives

Adaptation and resilience

- Increasing local food production helps build the city's resilience to disruptive events in the global supply chain[143] often caused by climate change.
- Reducing food waste can significantly reduce emissions; 8-10 % of global greenhouse gas emissions[144] are caused by unconsumed (e.g., lost or wasted) food.

134 https://www.mancity.com/meta/media/2axiocfh/sustainability-game-plan-august-2021.pdf
135 Bee Net Zero | The journey to becoming Net Zero
136 About | Real Foods Wythenshawe (realfoodwythenshawe.com)
137 Healthy Schools (manchesterhealthyschools.nhs.uk)
138 https://secure.manchester.gov.uk/info/200048/health_and_wellbeing/7621/growing_manchester
139 Community Fridges | Hubbub Foundation
140 Plastic Free GM - GM Green City
141 Renew Shops are open - Recycle for Greater Manchester: Recycle for Greater Manchester
142 WRAP - The Climate Crisis: Act Now
143 https://cityco.com/cms/wp-content/uploads/2021/02/MFB-Policy-Statement.pdf
144 https://www.unep.org/resources/report/unep-food-waste-index-report-2021

Health and wellbeing

- The move to a more sustainable food system can aid in tackling food poverty by providing equal access to healthy, affordable, and appropriate meals for all.
- Community participation in local food growing can facilitate physical activity as well as healthier food options. Participation can also reduce stress, improve mood, and increase confidence[145].

Inclusive, zero carbon and sustainable economy

- The Our Manchester Industrial Strategy[146] positions the development of our low carbon technology sector and clean growth as a priority; these actions will help to reduce indirect emissions and create local business and job opportunities.
- Supporting local SMEs not only reduces emissions associated with logistics but also helps to circulate wealth in the local economy[147].

Recommended Actions

Action needs to be taken by government at local and national level, by institutions and organisations in the private and voluntary sector, and by residents and communities across the city.

These recommended actions have been co-designed with stakeholders across the city to help enable everyone to play their full part in tackling the climate crisis and meeting the ambitious targets that Manchester has adopted.

To be delivered locally / direct control lies in Manchester:

Indirect emissions 1. **Businesses to improve the resource efficiency of their products and operations** to minimise indirect emissions and eliminate waste at source, eventually moving towards circular economy models, working across their value chains as appropriate. This is particularly relevant to the manufacturing, textiles, construction and food and drink sectors and should be done in conjunction with improving energy efficiency.

Indirect emissions 2. **Residents to become more informed consumers**, reducing their consumption of red meat and dairy, new clothing, consumer electronics and other manufactured goods.

Indirect emissions 3. Public, private and third sector organisations to **implement sustainable food policies and procurement practices** to minimise the consumption of red meat and dairy, and to reduce food miles and unnecessary food waste

Indirect emissions 4. All organisations and individuals to **reduce our water use**, and therefore the emissions associated with transporting and treating it.

Indirect emissions 5. All organisation and individuals to **reduce our production of waste** and increase our **reuse** and **recycling** rates.

To work at city-region level / with Greater Manchester partners on:

Indirect emissions 6. Continue to **help local businesses go green,** building on the Bee Net Zero website and partnership, with targeted support for small and medium-sized enterprises.

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[145] https://www.mind.org.uk/information-support/tips-for-everyday-living/nature-and-mental-health/how-nature-benefits-mental-health/
[146] https://www.manchester.gov.uk/downloads/download/7156/our_manchester_industrial_strategy
[147] https://www.theguardian.com/money/2013/dec/06/shop-locally-small-business-saturday-seven-reasons

Indirect emissions 7. Manchester University **NHS Foundation Trust** (MFT) to lead by example through the healthy enhancement of food and drink provision for patients, staff, and visitors within canteens, vending and retail outlets on NHS sites.

Indirect emissions 8. GMCA to help drive down overall rates of waste production and **drive-up rates of reuse and recycling** across all waste streams from domestic, commercial, and industrial activity.

To advocate for national government to do:

Indirect emissions 9. **Fund business support** programmes and initiatives that enable organisations of all sizes and in all sectors to take effective action to reduce their indirect emissions and shift to a circular economy.

Indirect emissions 10. Develop a **standardised labelling system** to inform consumers about the environmental and climate impacts of goods, extending the electronics rating system to other products.

Indirect emissions 11. Deliver national **behaviour change campaigns** to encourage consumer behaviour change around goods and services associated with hotspots for consumption-based emissions.

Indirect emissions 12. Support development of **more accurate data** on indirect emissions and increase requirements for indirect emissions to be included in **financial disclosures.**

3. ADAPTATION & RESILIENCE

Headline objective:

To adapt the city's buildings, infrastructure and natural environment to the changing climate and to increase the climate resilience of our residents and organisations.

Current climate impacts

Climate change modelling by the UK Met Office tells us to expect:

- Hotter, drier summers with +5.6°C summer mean daily temperature
- Warmer, wetter winters with +28% winter mean precipitation
- More frequent and intense weather events, including heatwaves and floods

Flooding is Manchester's biggest climate risk

- There are more than 48,000 homes at flood risk in Manchester[148]
- Storm Christoph January 2021 led to 3000 properties across Didsbury and Northenden to be evacuated
- February 2022, the UK's Meteorological Office named three major storms in one week for the first time; Manchester saw 430 at risk and disruption to critical infrastructure services

[148] https://democracy.manchester.gov.uk/documents/s30078/Approach%20to%20Flood%20Prevention%20and%20Management.pdf

Update on research and initiatives

Since publication of the Framework, Manchester Metropolitan University and Manchester Climate Change Agency (MCCA) have collaborated to produce:

- Manchester's climate risk: a framework for understanding hazards & vulnerability[149]. This provides organisations with a method for assessing exposure to climate risk.
- Principles of progressive resilience[150]. To help the city's businesses and residents to act on climate adaptation.
- Manchester Climate Ready (MCR) website[151]. Providing examples of adaption action from members of the Manchester Climate Change Partnership.

MCCA is also working with:

- The Met Office on:
    - A City Pack[152] to forecast climate projections at local level and to highlight the importance of addressing climate risk.
    - A heat mapping tool to give the city a better understanding of its exposure and vulnerability to heat over time.
- The University of Exeter on a Local Climate Adaptation Tool[153] (LCAT) that is intended to recommend adaptation action that will support health and wellbeing.
- The IGNITION project's green infrastructure baseline for the city[154].

Other policy drivers and enablers

- The Climate Change Committee's annual progress report 2022[155] raised the increasing need for adaptation action across the UK economy and sectors.
- Greening Finance: A Roadmap to Sustainable Investing[156] suggests mandatory requirements to the pensions and investment sectors to assess and disclose climate risk on portfolios, to help shift financial flows to align with a net-zero, nature-positive economy.
- The Environment Agency Flood and Coastal Erosion Risk Management Strategy[157] and Strategy Action Plan[158] sets out how they will deliver a £5.2 billion capital investment programme allocated to flooding and coastal erosion by 2027[159].

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[149] https://www.manchesterclimate.com/sites/default/files/Climate%20vulnerability%20framework.pdf
[150] Reference to be updated on publication
[151] Reference to be updated on publication
[152] Reference to be updated on publication
[153] https://thentrythis.org/projects/climate-and-health-tool/
[154] https://www.greatermanchester-ca.gov.uk/media/4135/ignition-fact-files-a-baseline-final.pdf
[155] https://www.theccc.org.uk/publication/2022-progress-report-to-parliament/
[156] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1031805/CCS0821102722-006_Green_Finance_Paper_2021_v6_Web_Accessible.pdf
[157] https://www.gov.uk/government/publications/national-flood-and-coastal-erosion-risk-management-strategy-for-england--2
[158] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/985128/FCERM_Strategy_Action_Plan_2021.pdf#:~:text=The%20Flood%20and%20Coastal%20Erosion%20Risk%20Management%20%28FCERM%29,Coastal%20Erosion%20Risk%20Management%20Strategy%20for%20England%20%28the
[159] https://www.gov.uk/government/news/environment-agency-sets-out-roadmap-for-more-flood-and-climate-resilient-nation

- National Infrastructure Commission sets out clear recommendations for adaptation action in its report: Anticipate, React, Recover- Resilient Infrastructure Systems[160]
- The UK Infrastructure Bank's Strategic Plan[161] sets out how it will explore projects that make the UK's infrastructure more resilient to climate change and better adapted to future risks- including the impact of climate change on financial assets.
- The Bank of England published its first climate stress tests in 2022[162], highlighting the need for UK banks and insurers to act on climate change to avoid climate-related losses.
- The Government's green taxonomy helps to tackle greenwashing by providing frameworks and legislation for sustainable financial disclosure.

Challenges

- Quantifying and assessing the risk of climate change to businesses, households and the financial system is in its infancy with gaps in standardised data and reporting, this makes it difficult to quantify the benefit of adaptation and resilience actions.
- Properties at increased climate risk may be subject to reduced lending rates from banks and increased insurance premiums, making insurance coverage unaffordable for many households[163].
- Adaptation planning takes time, especially for infrastructure, buildings, and the natural environment, which means actions need to start now to avoid 'lock-in' to high levels of risk in 2050 and beyond.[164]
- Future Homes Standards and building regulations[165] are not proposing to cover climate adaptation measures within new and existing buildings.
- DEFRA's survey *What does a well-adapted England look like?*[166] found that people in Greater Manchester need more information on the risks associated with climate change and the type of actions they can take.
- Increased investor interest in Environmental, Social and Governance practices (ESG), opens the risk of 'greenwashing'[167].

Co-benefits - Links to other headline objectives

Staying within our carbon budget

- Nature-based solutions that build resilience to climate change can also deliver net-zero benefits in the form of carbon capture and sequestration.

Health and wellbeing

- Actions to address climate risk will benefit the most vulnerable communities.

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[160] https://nic.org.uk/app/uploads/Anticipate-React-Recover-28-May-2020.pdf
[161] https://www.ukib.org.uk/strategic-plan
[162] https://www.bankofengland.co.uk/stress-testing/2022/results-of-the-2021-climate-biennial-exploratory-scenario
[163] https://www.bankofengland.co.uk/stress-testing/2022/results-of-the-2021-climate-biennial-exploratory-scenario
[164] https://www.theccc.org.uk/uk-action-on-climate-change/adapting-to-a-warmer-uk/
[165] https://www.gov.uk/government/consultations/the-future-homes-standard-changes-to-part-l-and-part-f-of-the-building-regulations-for-new-dwellings
[166] https://www.ukclimaterisk.org/wp-content/uploads/2020/10/2020-10-20-Is-the-UK-on-track-to- adapt-to-climate-change-Conference-Summary-1.pdf D
[167] Monetising environmental activities like carbon offsetting, without widely agreed standards to ensure they are paid fairly

- Nature-based solutions that build resilience can also provide access to good quality green space which supports health and wellbeing and enhances quality of life.

Inclusive, zero carbon and climate resilient economy

- Action to build climate resilience helps to grow the green technology and services sector which brings growth and jobs opportunities for Manchester, especially in sectors such as construction, water, infrastructure, and nature conservation[168].

Recommended Actions

Action needs to be taken by government at local and national level, by institutions and organisations in the private and voluntary sector, and by residents and communities across the city.

These recommended actions have been co-designed with stakeholders across the city to help enable everyone to play their full part in tackling the climate crisis and meeting the ambitious targets that Manchester has adopted.

To be delivered locally / direct control lies in Manchester:

Adaptation 1. Manchester City Council (MCC) to lead a **detailed risk and vulnerability assessment** of the city and produce an **adaptation plan**, directing action towards increasing the resilience of our critical infrastructure and most vulnerable communities.

Adaptation 2. MCC to ensure that its **planning, housing, and infrastructure policies** incorporate climate adaptation and resilience, including through deployment of nature-based solutions, to avoid increasing exposure to risk through new developments.

Adaptation 3. Public sector organisations to **transparently report** on what they are doing to mitigate the risks of climate change to their services and how these risks are being governed, in line with TCFD reporting standards.

Adaptation 4. **Manchester Climate Change Partnership** members to share learning on assessing organisational climate risks and building resilience through value chains.

Adaptation 5. Manchester Climate Change Agency (MCCA) to work with local partners such as the 'climate creatives challenge'[169] to explore new and innovative ways to **raise awareness of climate risk to communities**.

To work at city-region level / with Greater Manchester partners on:

Adaptation 6. **Greater Manchester Pension Fund** to actively work towards a greater percentage of its investment portfolio being defined as environmentally sustainable, as defined by the UK Green Taxonomy[170].

Adaptation 7. GMCA to work with Manchester partners to develop innovative ways to **unlock private investment** into adaptation and resilience.

Adaptation 8. **GM Environment Fund** to explore the use of Social Investment Tax Relief to drive funding into local social enterprises that deliver nature-based solutions to adapting to climate change.

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[168] https://www.theccc.org.uk/publication/uk-housing-fit-for-the-future/ and https://www.theccc.org.uk/publication/local-authorities-and-the-sixth-carbon-budget/
[169] https://www.climatecreativeschallenge.com
[170] UK Green Taxonomy – GTAG (greenfinanceinstitute.co.uk)

To advocate for national government to do:

Adaptation 9. To ensure climate resilience is factored into all **public capital spending**, including the National Infrastructure and Construction pipeline of £650 billion investment by 2030[171].

Adaptation 10. To set a **high level ambition for adaptation** to mirror the UK's target to reach net zero by 2050 as called for by the Climate Change Committee [172].

Adaptation 11. To set out a **National Resilience Strategy** to focus on the UK's ability to anticipate, assess, prevent, mitigate, respond to, and recover from known, unknown, direct, indirect and emerging climate risks[173].

Adaptation 12. Strengthen the ownership and accountability of the cross-Whitehall **National Adaptation Strategy** to drive adaptation principles across Government policy and strategy.

Adaptation 13. Develop national **adaptation and resilience infrastructure standards** as called for by the National Infrastructure Commissions report: 'Anticipate, React, Respond'[174].

Adaptation 14. Use the **Green Finance Strategy** to set the frameworks for more integration of investment into measures for resilience, emission reduction and nature restoration.

Adaptation 15. Develop more **localised climate risk and vulnerability data** to guide investment and decision-making, as recommended by The World Bank report[175].

Adaptation 16. Require infrastructure operators to develop and maintain long term **resilience strategies** that meet resilience standards[176].

Adaptation 17. Put in place longer term support to continue the work of **Flood Re[177]**, a joint initiative between the Government and insurers, making flood cover part of household insurance policies more affordable.

Adaptation 18. HM Treasury to **expand mandatory TCFD** reporting to the public sector[178].

To do differently / opportunities to innovate:

Adaptation 19. HM Treasury to commission a review on the **economics of climate resilience** to understand the costs and benefits and drive smarter public-private investment into adaptation[179].

Adaptation 20. HM Treasury to develop an **Environmental Investment Tax Relief** to incentivise investment into environmental outcomes including adaptation and resilience.

Adaptation 21. Advocate for national action to support the **Commission for Climate Resilient Infrastructure[180]** requiring all infrastructure to be resilient by 2025.

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171 https://www.gov.uk/government/collections/national-infrastructure-plan
172 https://www.theccc.org.uk/publication/2022-progress-report-to-parliament/#recommendations-to-government
173 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1001404/Resilience_Strategy_-_Call_for_Evidence.pdf#page12
174 https://nic.org.uk/studies-reports/resilience/
175 https://openknowledge.worldbank.org/handle/10986/35203
176 https://publications.parliament.uk/pa/cm201415/cmselect/cmenvaud/453/45309.htm
177 https://www.floodre.co.uk/
178 https://www.icaew.com/insights/viewpoints-on-the-news/2022/jan-2022/summary-of-public-sector-sustainability-reporting-landscape
179 https://www.gov.uk/government/speeches/finance-resilience-net-zero-and-nature
180 https://resilientinvestment.org/

4. HEALTH AND WELLBEING

Headline Objective:

To improve the health and wellbeing of everyone in Manchester through actions that also contribute to our objectives for CO2 reduction and adaption and resilience, with particular focus on those most in need.

The Climate Change Framework clearly articulates that the actions we need to take to reduce our CO2 emissions and adapt the city to climate change also have the potential to improve the health and wellbeing of Manchester's residents. And conversely; actions that improve health and wellbeing can simultaneously help to tackle the climate crisis[181].

It calls for new strategic initiatives to accelerate action and remove barriers that are limiting further action, and notes they need to be focused on the people and communities where climate action has most potential to improve health and wellbeing.

Update on research and initiatives

In 2020, the UK's Climate Change Committee published 'Sustainable Health Equity: Achieving Net Zero UK' [182] which gave evidence to show that climate change will lead to more unpredictable systemic shocks that will impact population health.

In June 2021, Greater Manchester was declared a 'Marmot City Region' following the publication of 'Build Back Fairer in Greater Manchester: Health Equity and Dignified Lives'[183].

Following this, in 2022, a Manchester Marmot Taskforce was established to take the Marmot recommendations and create a tailored action plan[184] for the city. Manchester's Climate Change Agency (MCCA) provided expert advice to this Taskforce.

Over the same period, MCCA worked with the Manchester Health and Wellbeing Board to establish an independent Health and Wellbeing Advisory Group for Manchester's Climate Change Partnership.

This advisory group has fed its expertise into this report and agreed to focus on developing a set of indicators to track climate and health that will support production of future Annual Reports that track the city's progress against the Framework objectives.

In addition to these initiatives, research on the effects of climate change on health and wellbeing is showing that the affects will be cumulative, becoming more severe and unpredictable over time if left unaddressed, commonly impacting our most vulnerable communities first and worst. It is also showing that climate change will impact people both directly and indirectly.

Direct impacts are created by our changing climate increasing our exposure to heat and cold, UV radiation, air pollution, pollen, emerging infections, and the impacts of extreme weather events such as flooding and its associated water-borne diseases.

- Poor air quality kills 28,000 to 36,0000 people in the UK each year[185].

[181] Manchester Climate Change Framework 2020-25.pdf
[182] https://www.instituteofhealthequity.org/resources-reports/sustainable-health-equity-achieving-a-net-zero-uk/main-report.pdf
[183] https://www.instituteofhealthequity.org/about-our-work/latest-updates-from-the-institute/greater-manchester-a-marmot-city-region
[184] Marmot Manchester plan to follow upon publication
[185] https://airqualitynews.com/2018/08/22/comeap-updates-estimates-on-uk-air-pollution-deaths/

- Heatwaves cause an average 8% increase in emergency hospital admissions on the top 5% of hottest days in the UK. For every 1°C increase in temperature over 20°C, ambulance callouts for the NHS increase by 1%[186].
- Whilst flood water poses a relatively small risk of drowning, people who are unable to relocate after a flood are at risk of ill health from living in damp homes and the experience of flooding can also generate severe mental health impacts that may outlast the immediate impacts of the flood itself.

Indirect impacts of climate change on population health are much more complex and systemic but are increasingly being recognised in global reports[187] including, under-nutrition related to food insecurity, respiratory illnesses from cold damp homes and rising levels of obesity due to lack of physical activity and provision of good quality green space or active transport infrastructure.

Co-Benefits / Links to other headline objectives

Staying within our carbon budget

- Energy efficient housing helps to reduce fuel poverty and creates warm, dry homes that improve health and wellbeing, and are more affordable to run. It also reduces our CO2 emissions.
- Cycling and walking (active travel) improves health outcomes, reduces pressure on the NHS and reduces our CO2 emissions, improving air quality.
- Healthy, sustainable, and resilient food systems ensure more affordable, nutritious diets and reductions in greenhouse gas emissions.

Adaptation and resilience

- Addressing the health impacts associated with heatwaves, cold spells, storms, and flooding is part of adapting to extreme weather events and building resilience to climate change.
- Creating neighbourhoods with access to good quality green space, improves health and wellbeing and increases our resilience to climate change through nature-based solutions.

Inclusive, zero carbon and sustainable economy

- Incorporating health and wellbeing into our measures of economic success (away from GDP) can support more inclusive local economic growth.
- Building environmentally sustainable health care systems and facilities creates a health care system resilient to climate change that is able to best support the economic growth and development of the city.

Recommended Actions

Health 1. The city to carry out a **vulnerability assessment** to map at hyperlocal level where climate change will exacerbate known health inequality so that action can be prioritised and targeted.

Health 2. MCCA to work with the Health and Wellbeing Advisory Group and Marmot Taskforce to **develop city-scale indicators** to track and report the impacts of climate change on health.

[186] https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/articles/climaterelatedmortalityandhospitaladmissionsenglandandwales/2001to2020/previous/v1
[187] https://doi.org/10.1016/s0140-6736(17)32464-9

Health 3. Manchester City Council (MCC) to incorporate health equity and climate action into **policies and strategies** in a consistent and transparent manner and implement methods to measure their impact.

Health 4. Manchester's Marmot Taskforce to lead implementation of it action plan.

5. INCLUSIVE, ZERO CARBON & CLIMATE RESILIENT ECONOMY

Headline objective:

To ensure that Manchester establishes an inclusive, zero carbon and climate resilient economy where everyone can benefit from playing an active role in decarbonising and adapting the city to the changing climate

Update on research and initiatives

Manchester Climate Change Agency (MCCA) continues to work with C40[188], CDP, and the World Business Council on Sustainable Development on the City-Business Climate Alliance[189] (CBCA) initiative.

Manchester is one of eight cohort cities alongside Dallas, Durban, Lisbon, New York, Stockholm, Tel Aviv and Vancouver.

A detailed survey is being carried out with Manchester Climate Change Partnership (MCCP) members to quantify the collective impact of their climate actions, draw out good practice that can be shared through a peer to peer learning programme, and identify opportunities to leverage expertise for collaborations on city-scale challenges.

MCCA is also involved in a partnership of business support organisations across Greater Manchester whose objective is to coordinate services and help make this the easiest place for businesses to go green. The partnership launched the Bee Net Zero website[190] in late 2021 to provide access to credible information and to signpost support services.

Manchester City Council's new Work and Skills Strategy[191] recognises the importance of understanding the skills gaps within the low carbon sector and capitalising on the opportunities for reskilling the local workforce. It acknowledges that one of the main barriers to delivering the right training and qualifications at scale is a lack of demand for training from employers and residents due to unstable demand in the market.

Recommended Actions

Economy 1. Manchester Climate Change Partnership (MCCP) to use its collective spending power and influence to **help create demand for green skills and local growth** in the green technologies and services sector, including building retrofit, electrification of heating, renewable energy generation and adaptation.

Economy 2. MCCP to accelerate the decarbonisation of its members through a **peer to peer learning** programme.

Economy 3. MCCP to leverage specialist expertise and capacity from organisations across the city into addressing specific city-scale challenges, following the blueprint of the zero carbon new build standard[192], including local offsetting.

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[188] The Alliance Partners — City-Business Climate Alliance
[189] Meet the Members — City-Business Climate Alliance
[190] Bee Net Zero | The journey to becoming Net Zero
[191] New Work and Skills draft strategy | Manchester City Council
[192] Manchester Climate Change Partnership adopts and endorses a Roadmap to Net Zero Carbon New Buildings in Manchester | Manchester Climate Change

Economy 4. MCCA to help **transfer relevant learning** from other CBCA cohort cities to Manchester.

Economy 5. MCCA and MCCP to promote **Bee Net Zero** services through their networks and support the development of new programmes that will benefit Manchester businesses and residents.

Economy 6. Bee Net Zero partners to share information on the impact being delivered by Manchester businesses receiving support and on the growth of the local green technologies and services sector.

6. ENSURING A JUST TRANSITION

A core principle of the Climate Change Framework is to ensure that all of Manchester's residents are protected from the impact of climate change and actions to help the transition to a zero carbon and climate resilient city do not have a negative impact on the most vulnerable people, and that the costs do not fall unevenly on those that are least able to afford them.

Rising cost of living

This update to the Climate Change Framework comes at a time of much economic uncertainty and significant increases to the cost of living.

For residents, we recognise that:

- High inflation is likely to reduce disposable incomes and spending power.
- More residents may be pushed into poverty, residents already in poverty may find it significantly harder to recover.
- Residents on the fringes of eligibility for support may be amongst the worst affected.
- 19.8% of Manchester households are now fuel poor.
- 12.3% of United Utilities customers in Manchester are accessing financial support.
- 11.4% of Manchester households are struggling with food insecurity and the number of food providers has almost doubled since 2017.

For business, we recognise that:

- Inflation has caused upwards pressure on wages, the cost of raw materials and energy, increasing business costs. Supply chain disruption is also contributing to price inflation.
- Decreasing consumer confidence and squeezed household budgets are leading to fewer sales and creating cashflow issues in the face of rising costs, particularly impacting on the retail, hospitality, culture, and leisure sectors.
- A potential Real Living Wage increase of 10-15% in October (to be implemented in March 2023) is positive for employees but may disincentivise investment by businesses, especially in sectors where low pay is more prevalent.

For the public and voluntary/charitable sector we recognise that:

- Price inflation is affecting budgets (especially relating to fixed costs like energy) and project viability, as well as lowering the relative value of funding awards provided.

- Uncertain funding reduces the ability of organisations to plan ahead and deliver services to support residents, communities and business.

Recommendations in the 2022 Update

The recommended actions outlined in this Update have been designed to reflect our understanding and knowledge on how we can tackle both climate change and wider socioeconomic challenges together, addressing multiple issues and delivering multiple benefits with well-designed actions. For example:

- Insulating properties creates warmer, healthier homes that are cheaper to heat and that create fewer greenhouse gas emissions.
- Improving the efficiency of product design and manufacturing processes reduces the cost of material and energy inputs to industry.
- Decarbonising our buildings, transport and consumption patterns creates opportunities for innovation and growth for our businesses which creates new jobs and skills for local people.

Details of these co-benefits are highlighted in each chapter of the Framework Update.

7. FINANCING THE TRANSITION

The cost of the transition to an inclusive, zero carbon and climate-resilient city, is significant. Estimates to decarbonise Manchester's local energy system is £13.2bln[193] (£4 billion by 2030).

The UK Cities Climate Investment Commission (UKCCIC) City Investment Analysis Report[194] describes the challenge in this way:

The transition of our existing carbon intensive systems to net zero will require significant up front capital and presents unique challenges for UK cities.

- **Scale**: it is estimated that £206 billion (in a range of £112-£334 billion) will be needed to achieve the net zero pledges made by the UK's Core Cities and London Councils.
- **Urgency**: implementation must accelerate as soon as possible to meet the targeted zero carbon deadlines.
- **Complexity**: the systemic transitions required within cities are complex and interlinked and are unlikely to be achieved successfully through individual decision-making.
- **Just Transition**: already stretched social inequities risk being exacerbated if the outcomes of policy changes are not appropriately considered.

The quantity of capital that must be deployed is beyond the reach of public finances and if the funding gap is met only by citizens and businesses there will be damaging impacts on the poorest sections of society which is a counter to the intended just transition.

Private sector finance is therefore critical in addressing climate change and the scale of private finance available is sufficient to support substantial progress towards our zero carbon ambitions.

However, there are significant hurdles to overcome and new approaches must be developed to unlock this resource.

[193] Local Areas Energy Plan to be published 2022
[194] https://www.corecities.com/sites/default/files/field/attachment/UKCCIC_Final_Report-1.pdf

This may include bundling climate measures together, coordinating delivery with multiple stakeholders and blending finance from different sources, for example grant-based funding and returns-based funding.

'Financing Green[195]' creates huge opportunities for UK financial institutions[196], however, the mechanisms to drive investment into green outcomes are new and need to be developed at scale to produce a rate of return that is attractive.

Financial benefits must be aggregated to support repayable finance and improvements in fuel poverty, health outcomes and carbon emissions must be evaluated and harnessed together in a precise financial framework.

Standardisation of reporting, governance, billing, and legal structures will be required to encourage private investor confidence and allow aggregation for scaled investment[197].

The city scale presents an attractive and substantial proposition for investors to bring together projects to generate sufficient scale, volume, and predictability.

The Green Finance Institute, The UK Infrastructure Bank and the UKCCIC are working to support local areas to develop investable pipelines of climate activity and the new financial mechanisms that will be needed to deploy them.

In its second phase of work, the Connected Places Catapult[198] are working in partnership with local authorities, industry, and the investment community to develop a gold standard for net zero investment, exploring the skills, capacities, and infrastructure that local areas need to develop projects and attract private finance.

MCCA secured Manchester's ongoing engagement with this work, with the city being one of three focus cities in this phase. The outcomes will help Manchester to develop robust business cases and investment models that give the confidence, scale and longevity needed by the investor community[199] to unlock private finance at scale into local climate action.

The government's Green Finance Strategy[200] and 'Greening Finance: a Roadmap to Sustainable Investing'[201] also recognise the role of the financial sector in delivering climate and environmental objectives, by setting out a series of steps for businesses and investors to factor climate risk into mainstream financial decision making:

- To green portfolios through aligning activity to the UK Green Taxonomy[202]
- To disclose data on the risks and vulnerability climate change poses to business through the Taskforce on Financial-related Climate Disclosures (TCFD)[203].
- To plan for the transition to a net zero future through publishing Transition Plans[204].

[195] https://www.gov.uk/government/publications/green-finance-strategy
[196] https://www. theccc.org.uk/publication/uk-energy-prices-and-bills-2017-report-supporting-research/ https://data.oecd.org/ gdp/gdp-long-term-forecast.htm
[197] https://www.corecities.com/sites/default/files/field/attachment/UKCCIC_Final_Report-1.pdf
[198] Connected Places Catapult - The UK's innovation accelerator for cities, transport & place leadership.
[199] https://cp.catapult.org.uk/news/uk-cities-climate-investment-commission-report/
[200] https://www.gov.uk/government/publications/green-finance-strategy
[201] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1031805/CCS0821102722-006_Green_Finance_Paper_2021_v6_Web_Accessible.pdf
[202] https://www.greenfinanceinstitute.co.uk/programmes/uk-green-taxonomy-gtag/
[203] https://www.fsb-tcfd.org/
[204] https://transitiontaskforce.net/

9. ENGAGEMENT WITH STAKEHOLDERS

Manchester Climate Change Agency (MCCA) has engaged with numerous stakeholders through a variety of channels over the last twelve months to ensure a diverse range of input has been incorporated into the recommended actions in this 2022 Framework Update.

An overview of these conversations is presented here and will be covered in more detail in the appendices that will accompany the final publication.

Conversations continue to be held including with Manchester Climate Change Partnership members and via a forthcoming survey to residents and businesses in late summer.

Engagement with residents and businesses

Manchester's first Climate Assembly was held between August and September 2021 as part of the Zero Carbon Cities project[205] and has fed into this Framework Update.

The materials from all the workshops can be found on the Commonplace website[206] and resulted in creation of a "Mandate on Climate Action"[207] which was taken to the COP26 Conference in Glasgow in November 2021.

A survey of residents and businesses was also carried out in September and October 2021 to understand:

- The types of positive climate action that they are already taking on – buildings, energy, transport, things we buy and things we throw away, food, green infrastructure, and nature-based solutions.
- The types of barriers that are encountered when trying to adopt more sustainable behaviours and the kind of additional support that may be required to enable them to do more, including practical and financial assistance, shifts in local and national policy, and a change in public perception.

In addition, detailed conversations with residents have been carried out via MCCA's In Our Nature community engagement programme which have involved understanding the climate priorities of diverse communities across the city.

MCCA is also part of a coalition of business support organisations who engage with thousands of small and medium sized companies on climate change.

The results of all these conversations have showed that the residents and businesses of Manchester want to take action to tackle climate change and need help to do so. They recognise that their ability to do more will be enhanced by more ambitious local and national policy and by increased and targeted investment in sustainable infrastructure such as active travel networks. They also see the benefits of climate action in terms of reduced energy bills, healthier lifestyles, new business opportunities and access to more green space.

Manchester Climate Change Partnership

Manchester Climate Change Partnership (MCCP) is a cross sectoral partnership of organisations that are engaged in helping transition the city to zero carbon. It includes representation from across the city's private, public, health, faith, culture, property, social housing, academic sectors and communities.

[205] https://energy-cities.eu/hubs/
[206] https://zerocarbonmanchester.commonplace.is/proposals/in-our-nature-community-assembly/step1
[207] https://res.cloudinary.com/commonplace-digital-limited/image/upload/v1633687544/projects/zerocarbonmanchester/workshops/Mandate_Upload.pdf

As such they bring a diverse and inclusive range of voices to the Framework Update and have been consulted on a regular basis including in July, September, and November 2021; and January, March, May and July 2022.

In addition, MCCP has several Advisory Groups[208] that have provided expert input and academic challenge to the Framework Update including:

- **Zero Carbon Advisory Group** – includes the University of Manchester's Tyndall Centre and Sustainable Consumption Institute, Manchester Metropolitan University, Friends of the Earth and Anthesis.
- **Adaptation and Resilience Advisory Group** – includes the University of Manchester, Manchester Metropolitan University, the Greater Manchester Resilience Unit, the Environment Agency, and Groundwork Manchester.
- **Health and Wellbeing Advisory Group** – includes the NHS, Public Health, Salford University and Manchester City Council.

Wider stakeholder engagement

MCCA has engaged with a wide variety of stakeholders throughout development of this Update, to ensure technical expertise and input from many sectors.

This includes engagement with:

- Manchester Climate Change Youth Board
- Manchester Housing Providers Partnership
- Manchester Strategic Housing Board
- Manchester Health and Wellbeing Board
- Manchester's Marmot Taskforce
- Manchester Food Board
- Manchester Zero Carbon Skills Group
- Manchester Zero Carbon Communities Group (In our Nature delivery partners)
- Manchester City Council:
    - Council Leader, Executive Member for Environment and Climate Change and Senior Management Team
    - Environment and Climate Change Scrutiny Committee
    - Zero Carbon Coordination Group
    - Officers leading on Work and Skills, Estates, Local Area Energy Planning, Planning, City Centre Regeneration, Growth and Development, Neighbourhoods, City Policy, Housing, Highways, Transport, Procurement, and Green and Blue Infrastructure
- Transport for Greater Manchester (TfGM)
- Greater Manchester Combined Authority (GMCA) Environment Team
- Electricity North West Ltd
- UK Core Cities Low Carbon Group
- City Business Climate Alliance partners – including C40, CDP and the World Business Council for Sustainable Development

[208] https://www.manchesterclimate.com/advisory-groups